NETWORK WORLD

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AT&T to cut switched service rates

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — AT&T will file across-the-board rate reductions for switched services with the Federal Communications Commission this week, *Network World* has learned.

Industry analysts said AT&T will slash $600 million to $700 million off current prices for switched offerings. A source close to AT&T, who asked not to be named, said the cuts represent an average 4% to 6% price reduction. The rate reduction would take effect Dec. 1, pending FCC approval.

The source also said AT&T has sent letters to its WATS customers saying that, with this filing, the company will do away with its banded WATS pricing plan in favor of a mileage-based rate schedule.

An AT&T spokesman acknowledged that the carrier will file rate reductions this week but would not divulge the extent of the cuts or confirm the move to mileage-based rates for WATS. He said prices for AT&T's Message Toll Service, 800, WATS, Software-Defined Network and switched digital services will be lowered. Pricing for private-line services will remain the same.

The changes were made possi-

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The floor of the NYSE

DAVID BALL/THE PICTURE CUBE

Wall St. networks stronger a year after Black Monday

Net managers at stock exchanges say upgraded processing systems could now handle a crash.

By Barton Crockett
Senior Writer

NEW YORK — One year after the stock market crash, network managers at the nation's major stock exchanges said they are better prepared to handle volatile market conditions and unusual trading volume.

In the year since Oct. 19 — Black Monday — the exchanges have taken pains to upgrade their networks and processing systems to gird for future market extremes.

On Black Monday, these systems were swamped by unprecedented trading volume. In an industry known for its timely processing of information, trading systems at times were backed up for hours. Some systems collapsed altogether, erasing buy and sell orders in the process.

Some of the most dramatic changes have occurred here at the New York Stock Exchange (NYSE), which has moved forward with an automation and networking program aimed at preparing trading systems to handle more than a billion shares per day by the early 1990s.

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3Com first to ship OS/2 LAN Manager

Local network maker delivers 3+Open LAN Manager; DEC, X/Open jump on bandwagon.

By Rex Bowman
West Coast Correspondent

BURLINGAME, Calif. — 3Com Corp. announced at its Network Systems Forum here last week that it has begun shipping 3+Open LAN Manager, the first commercially available local network operating system based on OS/2 LAN Manager.

The operating system got an added boost at the forum when Digital Equipment Corp. and the X/Open consortium joined the long list of LAN Manager supporters.

DEC said it will license OS/2 LAN Manager to enable its VAX line of minicomputers to act as local network servers. In addition, Microsoft Corp. announced that it has given X/Open, a group of leading computer manufacturers, the right to publish the specifications of LAN Manager for Unix in its *X/Open Portability Guide*. X/Open's involvement ensures that LAN Manager will be part of the open application environment that the consortium is promoting, and it may portend the day when Unix and OS/2 workstations will interoperate.

Other LAN Manager supporters include AT&T, Apollo Computer, Inc., Compaq Computer Corp., Digital Communications Associates, Inc., Excelan, Inc., Hewlett-Packard Co., NCR Corp., Tandem Computers, Inc., Ungermann-Bass, Inc. and Western Digital Corp.

OS/2 LAN Manager, codeveloped by Microsoft and 3Com and based on the multitasking OS/2, is expected to emerge as one of three preeminent operating system platforms for advanced local nets, competing with Novell, Inc.'s NetWare and IBM's LAN Server.

The broad industry support for LAN Manager is important to

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Empire Net helps N.Y. in cutting costs

By Jim Brown
New Products Editor

ALBANY, N.Y. — The state of New York expects to save $150 million over five years by consolidating traffic from 20 existing data networks, including the state lottery net, onto a statewide microwave backbone network.

The contract for the $180 million Empire Net, awarded recently to a consortium of vendors, represents the state's latest and boldest move to rein in communications costs.

"We're spending somewhere around $45 million a year for data services. That's outrageous," said Jack Heinsohn, director of telecommunications for the state.

Empire Net will lower that cost by eliminating many of the nearly 8,000 leased analog and point-to-point T-1 circuits currently linking remote state agency offices to host computers, 90% of which are located here.

Empire Net consists of a series of leased T-1 lines within each of New York's seven local access and transport areas.

Six LATAs are served by New York Telephone Co., and the other is served by Rochester Telephone Corp. The T-1 spans will be linked via Eastern Microwave,

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NETLINE

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DEC OFFERS a new voice response system that steals the show at the quiet Info '88 conference. Page 2.

TWO EUROPEAN FIRMS form a U.S. subsidiary to market OSI tools and consulting services. Page 2.

TECHNOLOGY'S IMPACT ON management is a hot topic at the Communications Managers Association's annual conference. Page 4.

THE FCC SAYS the RBHCs can employ strategic pricing of special access under certain circumstances. Page 6.

UNITED TELECOM REPORTS hefty third-quarter earnings and attributes the boon to dramatic improvements in US Sprint's financials. Page 55.

NEWSPAPER

FEATURE

PBX users benefit from vitality of ACD market

By Ranjana Sharma
Special to Network World

Telecom BUYER'S GUIDE

Automatic call distributors (ACD) are finding new market niches as a growing number of businesses use telephone systems to enhance customer service and business revenues. The explosion in 800 service offerings has further fueled the growth of call centers ranging in size from less than 10 agents to several hundred agents.

A recent study by Dataquest, Inc., a San Jose, Calif.-based market research firm, shows a compound annual growth rate of 20% since 1984 in 800 number usage.

Dataquest divides the ACD market into two segments: standalone ACDs dedicated to incoming call management and PBX-integrated systems that use add-on ACD software in conjunction with the PBX software. According to David Keeler, an analyst with Dataquest,

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DEC releases new voice response unit at Info '88

Company also announces enhancements to its E-mail Distributed Directory Service of All-In-1.

By Paul Desmond
Staff Writer

NEW YORK — Digital Equipment Corp. unveiled a voice response system at the Information Management Exposition and Conference (Info '88) here last week that lets callers access stored data using any type of telephone.

DEC also enhanced the electronic mail Distributed Directory Service of All-In-1 to let users address messages anywhere in a Mailbus network, regardless of system, simply by entering the recipient's name.

For an otherwise uneventful show, with light traffic on the show floor and no other major products introduced, DEC's announcements provided the highlight.

The DECvoice Response System combines digitized voice, speech synthesis and voice recognition technologies to give users flexibility in developing voice response applications in such fields as telemarketing, finance, order processing and health care.

"DEC has done a critically important thing in integrating three technologies into one environment," said Marion Mathison, vice-president of the Morristown, N.J.-based consulting firm Vanguard Telecommunications, Inc. Application designers will be able to employ all three technologies in a single program.

Up to four individual DECvoice boards can be installed on the Q-bus backplane of a MicroVAX II. Each board supports one RJ-11 telephone jack. The system is also offered as a complete, packaged system based on a MicroVAX II with a larger backplane that can support up to 16 DECvoice boards.

DECvoice builds voice recognition and voice synthesis into traditional voice response systems, which answer incoming calls with a recorded message and instruct callers how to use their push-button telephone as a terminal to access information.

With voice recognition, DECvoice supports rotary phones by having users speak the words for the numbers zero through nine. It also recognizes the words "oh" — often used instead of "zero" — "yes" and "no." The voice synthesis feature enables the system to read ASCII text files back to the caller, anything from product lists to health care records.

All-In-1 users have been able to store digitized voice messages and use DECtalk to synthesize

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European firms form unit to sell OSI tools in U.S.

GSI-Danet to offer test products, applications.

By Paul Desmond
Staff Writer

RESTON, Va. — A French conglomerate and its West German subsidiary last week announced the formation of GSI-Danet, a company based here that will market Open Systems Interconnection protocol test systems, OSI-compliant software and consulting services in North America.

GSI-Danet, formed by Group Generale de Service Informatique (GSI) of Paris and Danet GmbH of Darmstadt, West Germany, will sell the OSI products Danet has been marketing in Europe for more than two years. Danet offers off-the-shelf software test systems for X.25, File Transfer, Access and Management, and X.400 applications.

The company began planning a U.S. subsidiary after noticing that membership in the Corporation for Open Systems (COS) began to increase in 1986, signaling user interest in OSI. In 1987, it enlisted the Palo Alto, Calif., consulting firm Telematica, Inc. to market its OSItest line of OSI protocol test systems in the U.S.

GSI-Danet will take over Telematica's OSItest marketing role and round out the line of products available here with the introduction of OSI-compliant software, including OSItel 400.

Roy Daniel Rosner, GSI-Danet's president and chief executive officer, said OSItel 400 is a complete implementation of the X.400 protocol stack.

The start-up will also expand Danet's consulting services for OEMs and large end users interested in OSI. Richard Miller, president of Telematica, said he expects that his company will provide consulting services to GSI-Danet.

Rosner said he thinks the new company's competition will be other OSI software vendors, such as Santa Monica, Calif.-based Retix, which has X.400, X.25 and Manufacturing Automation Protocol products.

Rosner does not see GSI-Danet as a competitor to COS but rather as a complementary entity, since both are working toward the same end — promulgating

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Briefs

Tariff 12 net delayed. At the behest of the Federal Communications Commission, AT&T last week deferred for two weeks the effective date of its Tariff 12 custom network for American Express Co. The FCC indicated it needed more time to study the matter. MCI Communications Corp., US Sprint Communications Co., the Puerto Rico Telephone Co. and the International Data Communications Manufacturers Association, Inc. have asked the FCC either to suspend and study or reject the American Express plan. Three other Tariff 12 nets — for General Electric Co., E.I du Pont de Nemours & Co. and Ford Motor Co. — are currently being investigated.

Caribbean connection. AT&T announced last week that it will build a 2,430-mile, fiber-optic undersea cable in the Caribbean connecting the U.S. with Puerto Rico, the Dominican Republic, Colombia and Jamaica. AT&T will own 48% of the Trans-Caribbean cable, expected to be completed by 1990 at a cost of $130 million. Other U.S. companies involved in the venture include US Sprint Communications Co., MCI Communications Corp., Western Union Corp., RCA Globecom and Western Union Worldcomm. Foreign investors include London-based Cable and Wireless PLC, which will represent several smaller Caribbean islands, as well as telephone companies in Jamaica, Trinidad, Colombia, Haiti, Barbados and the Dominican Republic.

Consultants join forces. Ernst & Whinney, a Big Eight accounting firm based in Cleveland, last week acquired Network Strategies, Inc., a telecommunications consulting firm in Fairfax, Va. Financial terms were not disclosed. The acquisition will bolster Ernst & Whinney's current telecommunications consulting services offered through its Information Systems Group. Network Strategies will retain its name and remain in Fairfax.

GTE loses top executive. James Broadhead, president of GTE Corp.'s $12 billion Telephone Operating Group since 1986, resigned suddenly last week amid conjecture that he felt he would be passed over for president of the parent company. GTE said that Broadhead, also a senior vice-president and director of the corporation, resigned to pursue other interests. GTE said the resignation had nothing to do with an ongoing reorganization within the company.

James "Rocky" Johnson, GTE chairman and chief executive officer, has said he will choose his successor as president by April, and Broadhead was considered to be in the running for the job. On an interim basis, Kent Foster, group vice-president of Telephone Operations, will report to Johnson in place of Broadhead.

Big Blue speculation. According to reports published last week, IBM has discussed with several customers the idea of offering computer disaster recovery services. SoundView Financial Group, Inc., a securities firm specializing in high-technology issues, circulated the word on IBM but refused further comment. SunGard Data Systems, Inc. and Comdisco, Inc., the leading disaster recovery firms in this relatively young business, expressed doubt that IBM will join their market soon.

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Telecommunications

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Cullinet Software announced a developers' tool kit for building distributed applications that run on IBM mainframes and microcomputers. **Page 19.**

Local Networking

In the first of a two-part interview, Ray Noorda, president and chief executive officer of Novell, discusses the much-publicized rivalry between Novell and 3Com, Novell's networking strategy and the company's newly created Independent Hardware Manufacturers Support Program. **Page 23.**

Management Strategies

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Products & Services

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Shifting management structures a hot topic at CMA conference

Networks help companies revamp management hierarchies.

By Barton Crockett
Senior Writer

UNIONDALE, N.Y. — Capitalizing on communications technology to improve corporate management was a key topic at last week's Communications Managers Association (CMA) 1988 Annual Conference and Exposition here.

Nearly 5,000 New York area users and vendors attended the exposition, and many took part in a series of educational seminars sponsored by the CMA. The theme for this year's conference was "Telecommunications: Providing the Information Highway," but the management message was reiterated by speakers and attendees during the three-day conference.

CMA is a 40-year-old nonprofit users group composed mostly of communications professionals from the Northeast. It has 200 member companies.

"Communications managers must be at the forefront of demonstrating how to use information technology for strategic advantage," said Frank Blount, president of AT&T's Network Operations Group, during the show's keynote address.

Blount argued that in order for companies to use technology for a competitive edge, they must change the way they operate.

"I believe that we at AT&T, and perhaps you at your company, have invested too much in engineering and technology, and not enough in people and management processes," he said.

"You can't go around automating bad processes," he added. "I truly believe that for companies to achieve quality, they've got to be managed laterally, not vertically. This means integrating information technology with the corporate strategy."

Anthony Mattera, CMA president and manager of network planning with Prodigy Services Co. of White Plains, N.Y., also expressed this theme in an interview with *Network World*.

"The days of having a middle manager who just administers people are gone," he said. "This undoubtedly is a by-product of communications technology, which makes it very easy to have a flat management structure. I know that with my messaging system, everybody knows what's going on [inside the company]."

AT&T's Blount said the increased importance of communications technology makes network reliability more vital than ever. "I'm fast coming to the belief that the only reliability that will be acceptable in the near future is 100%, not 99%," he said.

Blount admitted that the fire at Illinois Bell Telephone Co.'s central office in Hinsdale, Ill., last May brought home the importance of reliability. "Hinsdale came as a rude shock to me. Frankly, I didn't know that in one building, three stories high, emanated every piece of fiber west of Chicago," Blount said. "If I had, I wouldn't have been sleeping well."

As a result, Blount said, AT&T has "redoubled its efforts to make sure the network is self-healing. We are spending a significant amount of money on creating nationwide fiber loops and building customer-specific diversity.

> "The days of having a middle manager who just administers people are gone," the CMA's Mattera said.

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"We've persuaded companies to bet their businesses on this stuff," Blount said. "Now it's our job to keep it running."

Mattera took time to outline his own management objectives for the CMA. "Our No. 1 goal is to increase our educational effort," he said. "This includes things like expanding our educational seminars, improving our newsletter and increasing the size of our annual show. We will not take on a public advocacy role, however. Other groups like the [International Communications Association] have more resources for something like that, and they do an excellent job." ☑

European firms form unit to sell OSI tools

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OSI. However, he did say that GSI-Danet is currently offering products that COS is still developing.

"We're supplying off the shelf some test suites that COS has been attempting to develop," Rosner said. "With respect to test software, we've got products that users can get right to work with because they've been used throughout Europe by most of the PTTs."

Miller said Danet's test systems are not designed strictly for OSI conformance testing. They can also be used after the product development stage for continued field testing and for integration into a network management system, he said.

GSI owns 60% of Danet, and Danet owns 50% of GSI-Danet. The other half of the start-up will be owned by investors and employees from North America.

Rosner said GSI, on the strength of its $263 million in sales for 1987, will provide most of the initial funding for the new venture. ☑

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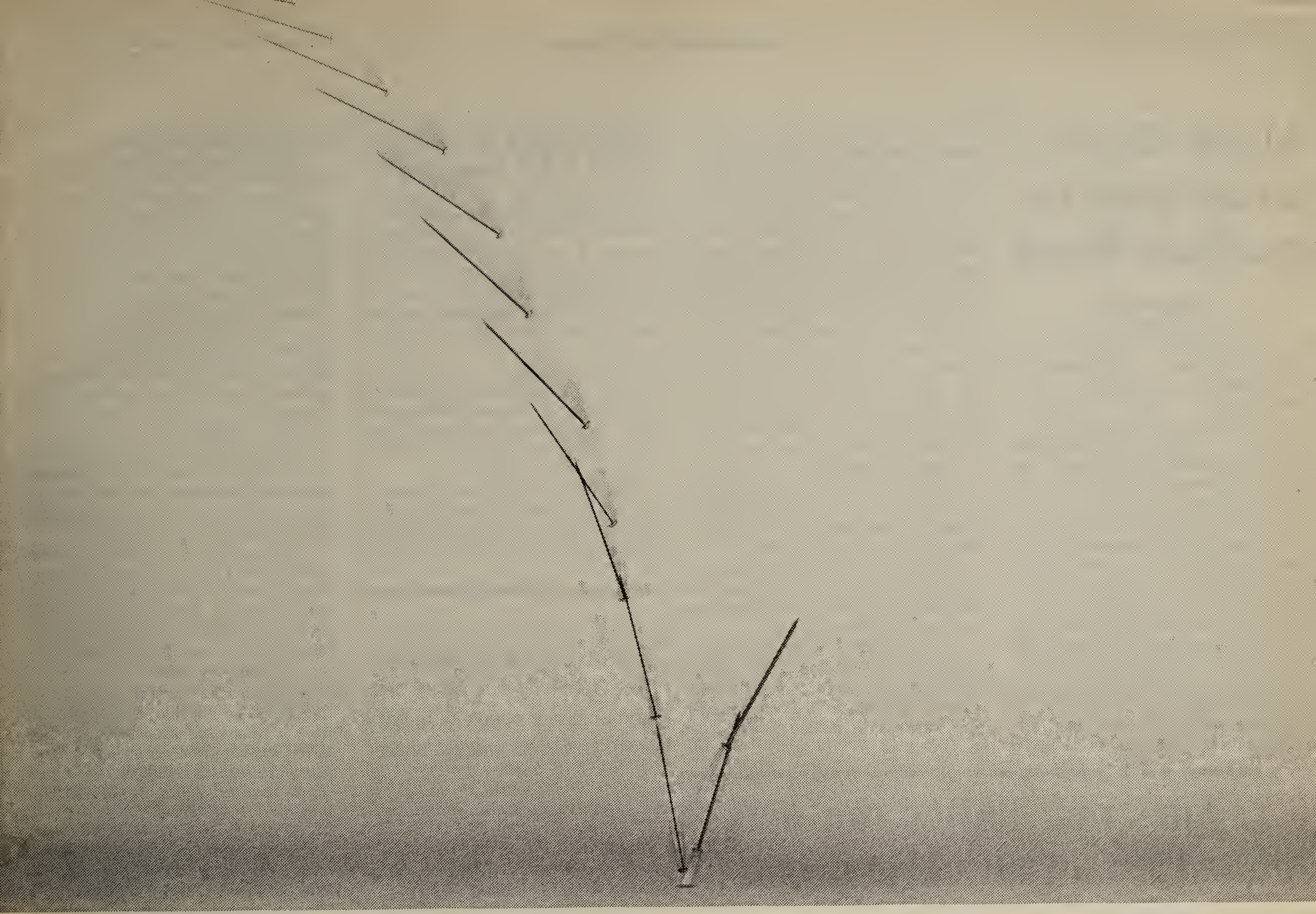

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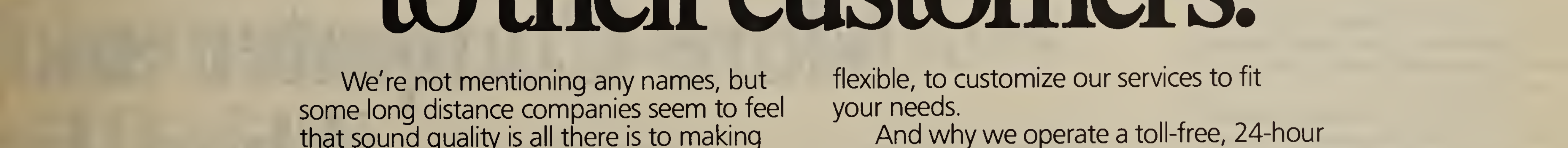

COMMUNICATIONS SERVICES VIA ITT

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Alpha Micro scraps plan to purchase Doelz

By Wayne Eckerson
Staff Writer

SANTA ANA, Calif. — Alpha Microsystems, Inc. last week said it will not exercise its option to purchase privately held Doelz Networks, Inc.

Alpha Microsystems purchased an option to buy Doelz's assets and liabilities late last month for an undisclosed amount ("Alpha Microsystems to buy struggling Doelz Networks," *NW,* Oct. 3).

An Alpha Microsystems spokeswoman said the microcomputer maker decided to forfeit its option after recent acquisition negotiations between the two companies stalled. The spokeswoman said the two companies disagreed about how to merge their top management, among other things, but would not comment further.

Doelz representatives could not be reached for comment.

Alpha Microsystems' plan to buy Doelz, which markets the Elite and Esprit lines of proprietary virtual circuit switches, perplexed analysts, who said they saw no relationship between the two companies' product lines. However, the Alpha Microsystems spokeswoman said the company will announce a new networking product next week that will shed light on why Alpha Microsystems was interested in purchasing Doelz. She would not comment further on the upcoming announcement.

Alpha Microsystems appeared to be a savior for financially troubled Doelz, which had been looking for a suitor throughout the summer. Doelz reported this summer that several companies had shown interest in negotiating a merger, but it did not cite Alpha Microsystems as one of those companies.

Analysts said Doelz was having difficulty attracting buyers because its reliance on proprietary technology went against the market trend toward open systems.

Doelz, which has been struggling with sluggish sales and a shrinking customer base, recently laid off 50 employees, representing one-third of its staff.

In addition, Doelz has been involved in a suit against AT&T for $25 million, charging the carrier with encouraging Bank of America National Trust & Savings Association to break a $20 million contract it had with Doelz.

FCC rules that RBHCs can make limited use of strategic pricing

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — After investigating the issue for three years, the Federal Communications Commission last week ruled that, in certain cases, the regional Bell holding companies can employ strategic pricing for special access tariffs.

In a decision announced after intense negotiation among the three commissioners, the FCC said the RBHCs should be allowed some freedom in pricing special access services, "not only to recover the costs of providing these services but to achieve certain marketplace objectives as well."

But the agency said this pricing freedom should not be unlimited and issued a set of guidelines that the RBHCs must follow in order to justify strategically priced access charges.

Strategic pricing is designed to achieve business objectives rather than reflect the actual cost of providing a service.

The International Communications Association (ICA), a vocal opponent of strategic pricing, has claimed that users have been overcharged hundreds of millions of dollars for high-capacity services each year while the FCC investigated such pricing practices. In December, the ICA asked a federal appeals court to force the FCC to rule on the legality of strategically priced tariffs.

Although the ICA expressed disappointment that the FCC did not find strategic pricing to be unlawful in all cases, Brian Moir, the group's legal counsel, said he was hopeful that the new guidelines would limit the practice.

However, he said, the effectiveness of the new rules will depend on how the guidelines are implemented and enforced by the FCC. Moir said he believes that the bulk of special access tariffs under investigation will be found unlawful, resulting in refunds to users of the private-line services in question.

The special access charges under investigation apply to the local portion of long-distance private-line services. These access charges are included in the interexchange carriers' tariffs and make up about 50% of the cost of long-distance service. The RBHCs have justified strategically pricing access services as a way to discourage bypass of switched services on the public network through the use of private-line services such as T-1, according to Colleen Boothby, a staff member of the FCC Common Carrier Bureau.

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3Com first to ship OS/2 LAN Manager

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3Com and other local network manufacturers that build on the operating system because it promises at least base-level compatibility between products. 3Com used the forum, attended by hundreds of its customers, Microsoft OEMs and consultants, to hawk the merits of its LAN Manager-based 3+Open.

3Com is shipping two versions of the product: 3+Open LAN Manager Entry System, for small stand-alone networks, and 3+Open LAN Manager Advanced System, for large networks that require links to various other networks.

Both versions support microcomputers running DOS and OS/2, and they give users the ability to run multiple applications concurrently. Both versions support the Network Basic I/O System interface and the Named Pipes mechanism for communications across programs or tasks.

According to analysts, 3+Open will give 3Com the ammunition it needs in its battle with Novell for market share.

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The Entry System, however, is designed for five or fewer users and will not support the internetworking and local net-to-host communications that the Advanced System supports.

Additionally, the Advanced System, designed to support an unlimited number of users, adds about 150 advanced programming interfaces (APIs) to the existing 250 OS/2 APIs. 3Com said this gives software developers a "simplified, open environment" for writing net applications. Both versions accommodate a range of network protocols, including Xerox's Xerox Network Systems and the Transmission Control Protocol/Internet Protocol.

The Entry System sells for $995, and the Advanced System sells for $2,995.

According to analysts, 3+Open will give 3Com the ammunition it needs in its battle with Novell for local network market share. 3Com and Microsoft are betting that users will want to adopt industry-standard operating systems for local network environments and move away from proprietary systems offered by Novell and others. "3Com is definitely trying to capture the standards high ground," said Jay Noe, a forum attendee and president of Insurance Support Services, Inc., an application development company.

Microsoft used the forum to release the results of a benchmark study the company sponsored to try to lay to rest the belief that proprietary products outperform those based on industry standards.

The tests, conducted by Neal Nelson & Associates of Chicago, compared the performance of Microsoft's LAN Manager with Novell's System Fault Tolerant (SFT) NetWare product and found LAN Manager either equal or superior to SFT NetWare in most categories analyzed.

Novell issued a statement after the forum questioning the study's validity. It said the test results are inconclusive because Novell was not given a chance to participate and because it is difficult to evaluate results when test criteria are not available.

DEC deal

Under the terms of the agreement Microsoft announced with DEC last week, the minicomputer maker will implement LAN Manager protocols and certain interfaces under VAX/VMS services. This will allow a VAX or MicroVAX running VMS and DECnet to act as an OS/2 LAN Manager server.

According to analysts, the agreement with Microsoft is a manifestation of DEC's surging interest in personal computer connectivity. "DEC is the strongest networking vendor in the world in terms of revenue," said Brad Baldwin of San Jose, Calif.-based Dataquest, Inc., a market research firm. "However, in PC LAN revenue, they're at the bottom. They're very weak on PC connectivity products, and this is going to help resolve that problem."

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Networks stronger after Black Monday

continued from page 1

The NYSE recorded its busiest day ever on Oct. 20, when more than 608 million shares were traded. Processing systems in place at the time were designed to handle a maximum of 450 million shares in one day, according to Geri DiCostanzo, senior vice-president of NYSE trading systems operations with Securities Industry Automation Corp., the data processing arm of the NYSE and the American Stock Exchange (ASE).

"We never in our wildest dreams expected volume like that," she said. "It was a great accomplishment just to survive."

The NYSE managed to avoid many of the problems that plagued some other exchanges. But some difficulties did arise. Trading systems handling particular stocks had to be shut down for as long as five minutes while disk drives were replaced and software programs were tweaked to handle unexpected volume.

The so-called ticker — the scoreboard of stock prices — ran as much as five hours behind the market, according to DiConstanzo, because prices were changing so fast. She insisted that all of the electronic data feeds the exchange runs to brokerage houses and quote vendors kept pace with market changes, however.

Ironically, the biggest systems problems the NYSE faced involved the relatively reliable but slow printers that form part of the automatic stock order execution system, or Super Designated Order Turnaround (SuperDOT).

SuperDOT includes roughly 700 communications lines that carry buy and sell orders involving fewer than 36,099 shares from brokers and brokerage houses to the exchange.

At the exchange, these orders are received by Tandem Computers, Inc. fault-tolerant computers linked in a proprietary network. These machines sort orders and send them to the specialists, who match buyers with sellers.

At the time of the crash, nearly 1,800 of the more than 2,000 stocks listed by the NYSE were matched manually. A specialist stood by a printer that typed out orders. To match a trade, the specialist scrawled the name of the buyer or seller, along with the market price, on the output.

The specialist then fed this into a scanner, which entered the completed deal into the Tandem computers.

"The printers, since they are physical devices, simply couldn't keep up. A backlog of orders developed, sometimes delaying execution more than an hour," DiConstanzo said

Normally, such trades are executed on SuperDOT in seconds. With prices plummeting at a dizzying pace, this delay meant that traders often had no idea at which price buy and sell orders would be executed.

Since then, the NYSE has replaced most of its printers with intelligent workstations, dubbed display books. The display books show buy and sell orders on a computer screen. A specialist needs only to touch the screen to match and record a trade.

In October, the NYSE had 215 display books handling 476 stocks. Now, it has 418 handling trades for 1,615 stocks, representing the bulk of its busiest issues.

In addition, the NYSE budgeted more than $200 million over the next five years to expand storage and processing capacity to accommodate a billion-share day by the early 1990s. As one of the first steps toward that goal, the NYSE in the next few weeks will finish an upgrade that will let it manage a volume of 700 million to 800 million shares, DiCostanzo said.

The order backlog that troubled traders on the SuperDOT system also caused headaches at smaller regional exchanges.

Brokers at these exchanges often route orders to the NYSE and American Stock Exchanges over a network called the Intermarket Trading System (ITS).

Many regional exchanges specify that any transaction that cannot be executed over ITS within one to two minutes must be executed on their own floors. Because of delays at the NYSE, many trades were kicked back to regional exchanges, increasing their volume and decreasing cooperation between exchanges during the peak of the crash.

The Los Angeles-based Pacific Stock Exchange (PSE), for instance, saw its automated order-entry system — dubbed Scorex — start losing orders as if they were sent into a black hole.

Scorex, which is similar to SuperDOT, normally handles about 10,000 transactions per day, according to John Parady, the PSE's executive vice-president of technology services. During the crash, however, Parady said this number topped 47,000 and the system started losing orders.

According to Parady, the volume of trades exceeded the capacity of the four CC80 intelligent controllers from Torrance, Calif.-based Computer Communications, Inc. that receive and route all orders transmitted over the Scorex system.

By February, he said, the PSE had upgraded the 8-year-old CC80 controllers to handle 70,000 transactions per day. He added, however, that the exchange plans "to replace and upgrade our entire information processing system, including replacing all our computers and communications systems, as soon as possible."

Similarly, the Philadelphia Stock Exchange had severe problems with its Philadelphia Stock Exchange Automated Communication and Execution (PACE) order-entry system. At the time of the crash, PACE had enough capacity to handle up to 30 orders per minute, or about 12,500 orders per day, according to Bruce Smith, senior vice-president of strategic planning with Financial Automation Corp., the data processing arm of the Philadelphia exchange.

On Oct. 19, however, the number of orders rose to 52 per minute and topped 17,000 for the day, Smith said.

This led to delays of more than two hours because the two IBM System/88 fault-tolerant minicomputers that control PACE couldn't process orders fast enough. On Oct. 20, the exchange asked firms to stop using PACE because trading volume was too high.

By February, Smith said, the Philadelphia exchange had expanded its system to handle more than 35 transactions per second and increased its storage capacity to more than 40,000 trades on any given day.

Firms invest in nets after '87 market crash

By Bob Brown
Senior Writer

Last October's stock market crash ravaged stock prices and forced many Wall Street firms to retrench, but vendors of network and computer equipment said Black Monday also presented them with new sales opportunities.

As a result of the crash, stock exchanges and some securities firms invested millions of dollars in new network and processing systems or upgraded old systems in case there is another Black Monday on the horizon, the vendors said (see "Wall St. networks stronger a year after Black Monday," page 1).

Mark Smith, securities industry director at Stratus Computer, Inc., said the crash reemphasized how important communications technology is to the marketplace. Smith was vice-president of technology at the American Stock Exchange during the crash.

"There was a shift in emphasis back toward the operations areas of the firms and away from the trading area," Smith said. "I'm sure that everyone is spending more money on technology in '88 than they were in '87, and I'm sure they'll spend more in '89 than in '88."

Stratus, Smith noted, won several big contracts in the securities industry this year, including the sale of its XA2000 Continuous Processing Systems to the International Stock Exchange, formerly the London Stock Exchange, and Jefferies & Co., a Los Angeles-based institutional trading firm. Combined, the contracts were worth $2.3 million, he said.

Smith also pointed to a recent contract signed by the National Association of Securities Dealers, Inc. (NASD) for a Stratus processor that will support a private placement market system NASD is developing. "That's an example of how people are beginning to gear up their operations," he said.

While some brokerage houses have expanded their network capabilities, stock exchanges have been more aggressive in improving their networks and processing capabilities, according to Ray Villareal, Tandem Computers, Inc.'s securities industry marketing manager.

For example, the New York Stock Exchange is using Tandem products to increase its processing capacity to the point where it will one day be able to handle one billion shares a day. The exchange had trouble handling a record 608 million shares a day on both Oct. 19 and 20 last year, Villareal said.

"As for some securities firms, they took a long, deep breath before they became active again," Villareal conceded. "We're just beginning to see them buy again."

Jeff Goverman, an analyst with Sound-View Financial Group, Inc. in Stamford, Conn., went so far as to say, "The securities and financial service industry is a sore spot for Stratus, Tandem and DEC now."

It will be a couple of years before some securities firms start buying again, he said.

Because the securities business is transaction-oriented and stock transactions have been down sharply this year, many firms have not had an incentive to upgrade the capacity of their nets, Goverman said.

(continued on page 54)

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Debtman, a computerized product that calculates the national debt second by second, was recently introduced by a Pasadena, Calif.-based company named osfa (one size fits all). The small deskpiece, which also serves as a digital clock and calendar, keeps track of America's debt. The product retails for $39.95 and can be ordered by calling (800) 332-8626.

People & Positions

Retix, a Santa Monica, Calif.-based maker of data communications products, last week appointed **Stephen Frankel** as president. Previously, Frankel was president and chief operating officer of Emulex Corp.

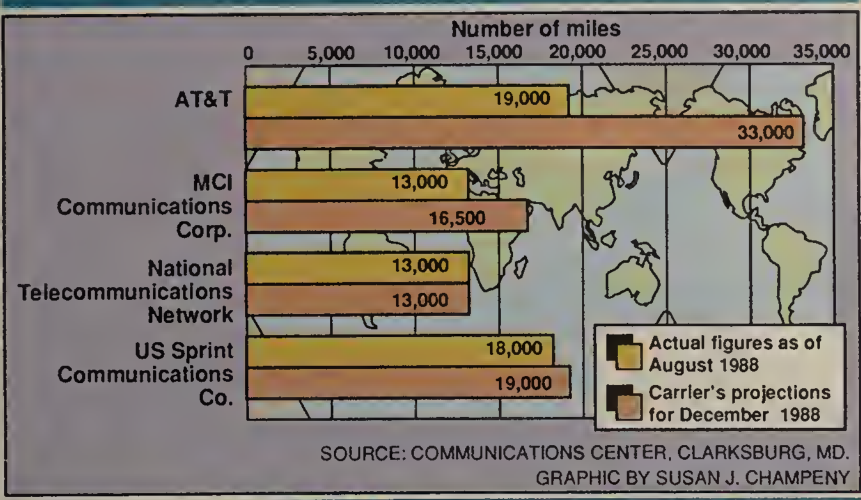
Michael Bennett recently was named president of **Interlan, Inc.,** formerly Micom Interlan. Bennett was previously vice-president of operations at the Boxborough, Mass.-based maker of local-area network products.

Nicholas Mihalas was recently named president of **SmartCard International, Inc.,** a New York-based maker of smartcards used for applications such as as volume record keeping. Mihalas has been executive vice-president and chief operating officer at the company since 1987.

Arlen Lessin, SmartCard International's former president, will remain chairman and chief executive officer.

Peter Lloyd recently was named president and chief executive officer at **Speech Plus, Inc.,** a Mountain View, Calif.-based company that makes computer-generated speech products.

Fiber route miles of major long-haul carriers



SOURCE: COMMUNICATIONS CENTER, CLARKSBURG, MD.
GRAPHIC BY SUSAN J. CHAMPENY

NTIA lowers the boom on telecom regulation in U.S.

Report finds country stuck in a 'policy gridlock.'

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — The National Telecommunications and Information Administration (NTIA) criticized telecommunications regulation in the U.S. in its recently released study "Telecom 2000" — the first comprehensive report on telecommunications policy in 20 years.

The 672-page report depicts the country as being trapped in a "policy gridlock" created by the legal maneuverings of "self-seeking" corporations and conflicts between the multiple groups responsible for telecommunications policy. The lack of a coherent telecommunications policy has hurt U.S. consumers by slowing the introduction of new technologies and information services and has hampered the nation's ability to compete globally, the NTIA report said.

NTIA, an agency within the U.S. Department of Commerce, advises the president on telecommunications policy. NTIA Administrator Alfred Sikes, speaking at a press conference at which the report was introduced, said he is hopeful the next administration will use "Telecom 2000" to formulate future communications policy goals.

> The lack of a coherent telecommunications policy has hurt U.S. consumers, NTIA said.

▲▲▲

Sikes said a staff member of the communications advisory committee for Massachusetts Gov. Michael Dukakis, the Democratic candidate for president, has asked for a copy of the report.

Sikes has been an outspoken critic of U.S. District Court Judge Harold Greene's handling of the AT&T Consent Decree, and this theme was brought out repeatedly in the report. "The present situation, where procompetitive regulatory initiatives can be blocked by a single federal district court, is unsound as a matter of fundamental policy," the report said.

> "The present situation is unsound as a matter of fundamental policy," the report said.

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One of the primary recommendations of the NTIA report was to remove restrictions on the regional Bell holding companies that prevent the RBHCs from competing in manufacturing and information services. If the RBHCs were freed to enter new business areas, they would have an incentive to enhance the nation's network to accommodate new services, Sikes said.

The primary challenge for regulators in the future will be to modify the nation's regulatory structure so that companies can respond to the increasing convergence of communications technologies. "It's important we understand the convergence that's going on and the need for communications companies — not for telephone companies, mobile communications companies, cable companies or television companies — but communications companies," Sikes said.

Businesses buy the bargain of leasing

Tax Reform Act of 1986, payment packages spur communications users to stop purchasing.

By Bob Brown
Senior Writer

Competition among lessors of communications equipment and computers is brisk, industry sources report, as providers battle to satisfy users' demands for flexible financing of their costly and complex networks.

Among the forces that have driven a growing number of users to lease equipment rather than buy it is the Tax Reform Act of 1986. The act's elimination of the investment tax credit has put buying and leasing on a more even basis for users.

Leasing also lets users pay for their equipment with money from their operating budget rather than their capital expenditures budget, and it allows them to avoid large, up-front payments.

Another reason that users lease is to avoid getting stuck with outdated voice and data communications products. By arranging a three-year lease, for example, a user can install a new piece of equipment and leave the task of selling the old equipment to the leasing company.

According to IDC Financial Services Corp., a Framingham, Mass.-based company that provides market information to leasing companies and lessees, companies that lease and resell computer and communications gear will record combined revenues of about $15.6 billion this year. The computer and communications equipment leasing market is so broad that no one company controls more than 5% of it, industry sources said.

"The vast size of the marketplace gives any number of leasing companies an opportunity to be profitable," said Patrick Burton, a research analyst who follows the leasing industry for Piper, Jaffray & Hopwood, Inc., a Minneapolis-based investment banking and brokerage firm.

Because there is no clear leader, users can have difficulty deciding which leasing company is best for them, he said.

According to George Newman, product manager of the communications leasing planning service at IDC Financial Services, there are basically two types of lessors: independent leasing companies, such as Comdisco, Inc., LDI Corp. and Capital Asso-

(continued on page 12)

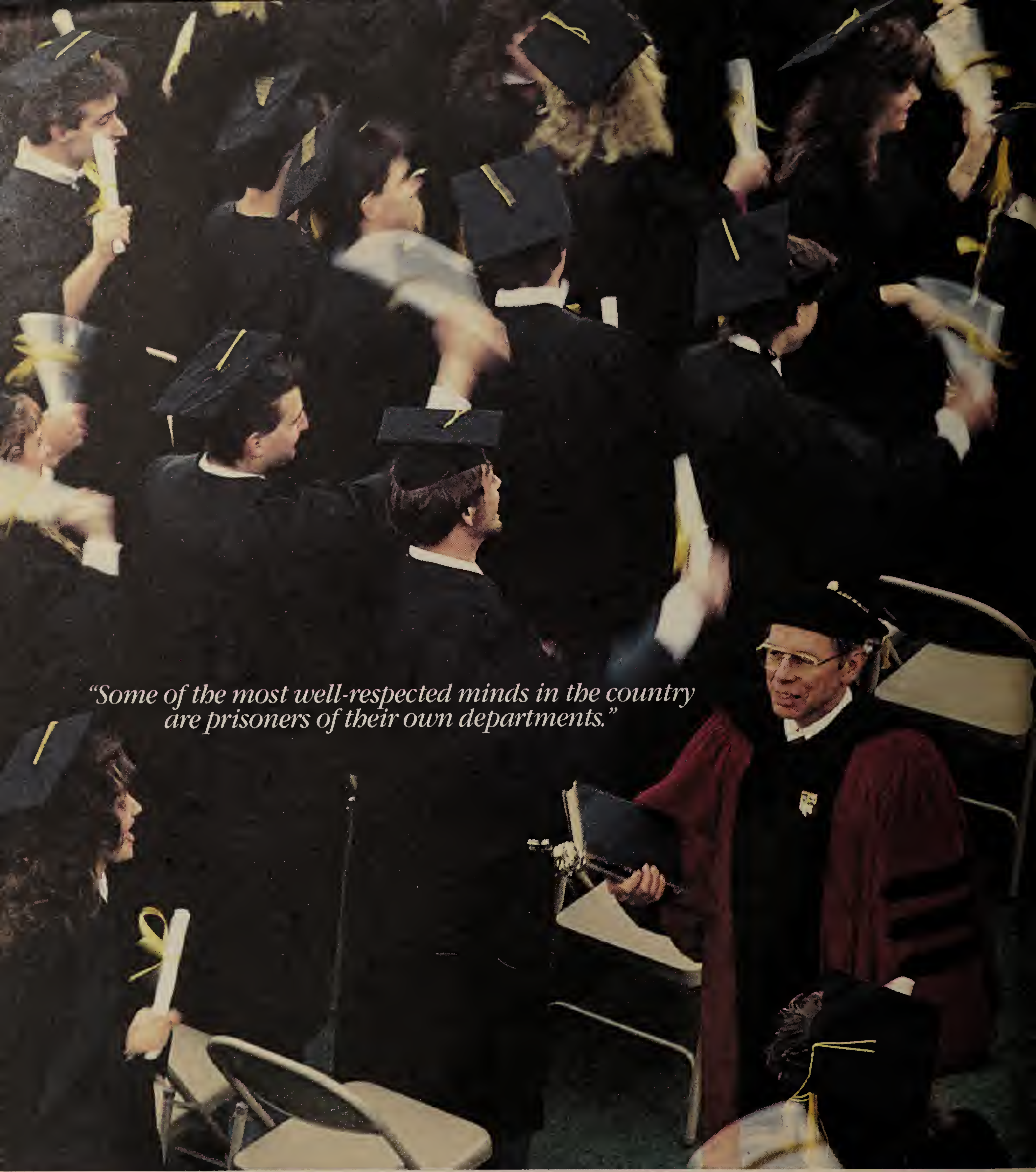
INDUSTRY BRIEFS

Digital Equipment Corp. last week announced a new warranty policy that effectively hikes prices on most products by 6% to 9%. The policy goes into effect this month in the U.S. and later worldwide. DEC will begin charging customers for what had formerly been a free one-year on-site maintenance warranty. Service will still be free to users who bring their equipment to DEC facilities for repair. DEC also said it will increase by 2% the price of add-on hardware and software purchased separately from computer systems.

Ameritech last week announced the formation of a new subsidiary — **Ameritech Applied Technologies** — that will provide integrated information and communications systems for Ameritech and its subsidiaries. Based in Chicago, the new subsidiary will be responsible for systems analysis, software development and maintenance, data base design, network management and end-user computing support.

Octel Communications Corp. last week released fiscal 1989 financial results for the first quarter, which ended Sept. 30. The company reported net revenue of $17.96 million, an increase of 127% over the net revenue figure of $7.89 million for the corresponding period last year. Net income for the quarter was $2.61 million, up 263% over net income of $722,000 in last year's first quarter.

Octel attributed its strong results to continued success in selling voice-processing products to Fortune 1,000 companies. Octel designs, manufactures and markets voice-processing systems and has an OEM agreement with Hewlett-Packard Co. under which HP distributes Octel products in Europe.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Businesses buy the bargain

continued from page 9

ciates, Inc., and captive leasing companies, such as AT&T Credit Corp. and IBM Credit Corp., whose parent companies manufacture much of what they lease.

Each type of lessor claims to offer advantages over the other.

Richard Kazan, chairman and chief executive officer of Capital Associates, an independent lessor and reseller of computer and communications systems based in Colorado Springs, said companies such as his serve users' needs better because leasing equipment is their principal business.

Leasing companies affiliated with manufacturers serve as vehicles to sell their parent companies' products, whereas independent companies are more willing to lease equipment from a variety of vendors, Kazan said. "There is an obvious conflict there."

Jerry Kish, senior vice-president of finance at LDI, a Cleveland-based firm that leases and sells new and used computer and communications equipment, and supplies technical services, said his company tries to beat the competition by "anticipating changes in the equipment market and in customer needs."

LDI sales representatives stay in close contact with clients so they know when it is time for a customer to lease a more suitable piece of equipment, he said.

On the other side of the ledger, a spokesman for AT&T Credit, a wholly owned leasing subsidiary of AT&T, said his company provides users with the one-stop shopping many of them desire. Although the independent firms call themselves full-service firms, they still usually require a user to deal with the manufacturer for maintenance and support, he said.

Richard Kazan

Criticism of AT&T Credit as a mere front for AT&T is not accurate, he said, since AT&T also leases other vendors' equipment. In fact, AT&T Credit even leases equipment such as airplanes and trucks so that its financial success will not be completely tied to that of AT&T.

Robert Sullivan, an analyst who covers several leasing companies for the New York-based brokerage firm PaineWebber, Inc., said that captive and independent leasing companies are on a fairly level playing field.

"The only advantage the captive leasing companies have over the independent ones is that they know when the equipment they are leasing is going to become obsolete," Sullivan said. "That allows them to better gauge the residual value of a piece of equipment at the end of a lease."

Both third-party and captive leasing companies have a lot to offer users, according to Allen Trivino, manager of computer contracting at Xerox Corp.'s Xerox Real Estate/General Services Division in Webster, N.Y. The Xerox division, which provides Xerox with its data processing and communications equipment, has been leasing equipment for the past 14 years, Trivino said.

"I feel we've saved a lot of money by leasing," he said. "We don't want to hand over $4 million up front for a mainframe."

Over the past five years, the quality of leasing companies has improved, Trivino said. "The number of major leasing companies has gotten smaller because of consolidation, but the ones left are stronger," he said.

Gary Windjack, managing director of Stottler Stagg Technologies, Inc., a telecommunications consulting and engineering firm based in Cape Canaveral, Fla., said his clients have taken to leasing in the past two years. Whereas only about 10% of his clients leased equipment two years ago, about 50% do now.

Windjack encourages his clients to arrange for leased equipment to be upgraded at low or no cost in case it becomes obsolete or the user's needs change.

"The most common word I hear from users is 'flexibility,'" Kazan said. "As customers restructure their businesses, they want to move equipment in and out. This is why we really want to put together a master lease for our customers so that we can develop a relationship with them on a multiyear basis." ◘

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Worth Noting

US West Advanced Technologies, Inc., a subsidiary of US West, Inc., recently said it will increase its research and development spending to 3% of its total revenue by 1992.

Carrier Watch

Southern Bell Telephone and Telegraph Co. said it is installing fiber-optic cable to serve a recently built residential area on Governor's Island in Lake Norman, near Charlotte, N.C. The local-loop fiber will be used to provide basic telephone service.

Southern Bell already has two projects under way in Florida aimed at bringing fiber to homes: one south of Orlando, at the Hunter's Creek development, and another north of Orlando, at the Heathrow development.

At Heathrow, Southern Bell later this year will begin using the fiber to deliver data, video and basic telephone service to residents. At Hunter's Creek, Southern Bell is currently using the fiber to deliver cable television to more than 100 homes.

The Governor's Island project marks the first time fiber has been brought to homes in North Carolina, according to Southern Bell.

Centel Corp. of Chicago announced it has completed the acquisition of **United TeleSpectrum, Inc.**'s 16-state cellular mobile communications and paging operations.

Centel paid $775 million for the operations and now has control of 40 metropolitan areas with a combined population of approximately 13 million people.

United TeleSpectrum, a subsidiary of United Telecommunications, Inc., was the majority owner in 21 metropolitan areas with a combined population of more than 7 million people. The company was a minority owner in 17 additional metropolitan areas. The company's 29 paging sys-

(continued on page 17)

IBM, Siemens, RBHC study Europe marts

Companies finish study targeting five telecom services as having the most potential in Europe.

By Paul Desmond
Staff Writer

PARIS — Hoping to get a jump on their competition, IBM, Siemens AG and Bell Atlantic Corp. recently completed a joint study here that identifies five telecommunications services with the most growth potential in Europe.

The study, outlined in the planning stage last October at Telecom '87 in Geneva, examined more than 30 "intelligent network" services and their market potential in 16 European countries and Australia. Some of the services require Integrated Services Digital Network features that are now emerging in the U.S., while others are offerings Americans have enjoyed for years.

An intelligent network is defined as one that supports enhanced call handling and customer applications from intelligent network nodes.

Helmut Forner, a senior telecommunications strategist for IBM's European operations, said the three firms decided on the five services through discussions among themselves and limited input from a consultant who provided insights on user interests.

The five services pinpointed by the 600-page survey are: toll-free "green numbers," known in the U.S. as 800 numbers; alternate billing services, which allow credit card calling without operator intervention and the billing of calls to an alternate number; emergency response service, an advanced version of the U.S.' 911 emergency service; private virtual networks, which offer private-line-type services over switched facilities; and wide-area Centrex, which provides for call-forwarding and abbreviated dialing.

Each of the three study participants stands to gain market share should the European telephone companies agree to buy the equipment necessary to provide these services. Bell Atlantic International, Inc., a Bell Atlantic subsidiary based in Arlington, Va., would provide consulting services in Europe. IBM would supply the computer systems needed to offer the intelligent network applications, and Siemens would sell the switching equipment.

The joint study, however, in no way precludes any one of the participants from pursuing the services on their own or with oth-

(continued on page 16)

WASHINGTON UPDATE

BY ANITA TAFF

FCC rejects MCI Tariff 15 motion. The Federal Communications Commission moved quickly last week to reject an effort by MCI Communications Corp. to limit the customer data MCI will be required to supply in connection with the agency's investigation of AT&T's Tariff 15.

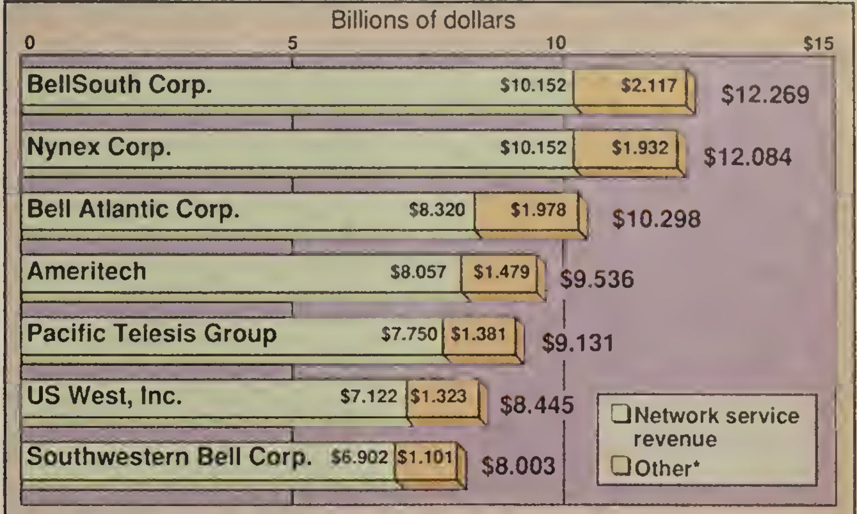
MCI filed a motion with the FCC at the end of September asking that the FCC drop its "dragnet request" for information on all single-customer network arrangements offered by MCI, AT&T and US Sprint Communications Co. during 1988. MCI argued that the only information with a bearing on the Tariff 15 investigation has to do with the specific offers made to Holiday Corp. by AT&T and MCI.

The FCC took only one week to deny MCI's motion in an order adopted Oct. 7 and released Oct. 11. The FCC said it required information beyond the specifics of AT&T and MCI's offers to Holiday in order to decide the larger policy issues involved in single-customer offerings. The FCC had already reached a decision by the time AT&T filed an opposition to MCI's motion last week.

Nynex in uphill battle. Nynex Corp., still struggling to enter the international telecommunications market, faced strong opposition last week in its court battle to purchase a 50% interest in the PTAT transatlantic fiber-optic cable. AT&T, MCI Communications Corp., the Ad Hoc Telecommunications Users Committee and Teleport Communications-New York urged

(continued on page 16)

RBHC revenue breakdown



*Other includes directory publishing, equipment leasing and software sales.

SOURCE: EASTERN MANAGEMENT GROUP, PARSIPPANY, N.J.

Figures are for 1987.

GRAPHIC BY SUSAN J. CHAMPENY

Device lets users transmit text messages from phone

Fon-Ex system supports alphanumeric beepers.

By Paul Desmond
Staff Writer

NEW HOPE, Pa. — Fon-Ex, Inc. recently announced a device that will enable paging system operators to let customers generate alphanumeric messages using their push-button telephones instead of involving an operator.

Fon-Ex President Bernard Riskin said his company has granted CUE Paging Corp. of Irvine, Calif., exclusive rights to use the system and market it to other companies that support alphanumeric messaging beepers.

Eventually, Riskin said, the technology could make it possible for business travelers to use hotel room telephones or pay phones to send electronic mail or telex messages or even to generate facsimile copy.

Riskin, the developer of the software that drives the messaging system, said it uses a data base of letter and word probabilities that interprets sequences of letters as they are entered using a push-button phone.

For example, the system interprets the entry 8-4-3 as "the," the most common word formed out of that particular combination of nine possible letters.

Today, callers who want to send alphanumeric messages call them into operators who key them into a terminal. The need for operators is what makes alphanumeric messaging expensive, according to Leo Jedynak, vice-president of engineering and operations at CUE. Jedynak said paging companies charge anywhere from 60 cents to $1.20, in addition to a monthly base charge, to send an alphanumeric message.

That, plus the high cost of the alphanumeric receivers, is why only about 55,000 of the seven million pagers currently in use nationwide have LCD alphanumeric displays, Jedynak said.

The Fon-Ex technology will reduce the cost of the alphanumeric service by about 300%, he claimed. As the price drops, demand for the receivers will increase, making it possible for manufacturers to lower the price of the equipment.

To contact a paging service subscriber, users call a local access number that connects them to either a Sun Microsystems, Inc. workstation or an IBM Personal System/2 running the Fon-Ex software.

> Eventually, travelers could use hotel room phones to send E-mail or telex messages.

▲▲▲

Synthesized voice instructions walk the user through the messaging process. At the end of each word entered by the caller, a synthesized voice reads the word back for verification.

When the system encounters words it does not understand, the voice will repeat each letter back to the user. Using the pound key, the caller can then change any letter that has been misinterpreted. Likewise, entire words and messages can be deleted and rerecorded.

Riskin's system even accounts for the letters Q and Z, which are not included on the telephone keypad. The system presumes the letter Q is lumped in with P, R and S, while Z falls with W, X and Y.

(continued on page 17)

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HEWLETT
PACKARD

IBM, Siemens, RBHC study Europe marts

continued from page 13

er partners, according to Thomas Healey, Bell Atlantic's director of corporate media relations.

Martin White, managing director of the European technology services group of International Data Corp. in London, said the study was conducted in preparation for 1992, when international trade barriers in Europe will be lifted.

The Common Market environment is expected to create new demands for advanced telecommunications services that will foster competition among the post, telegraph and telephone administrations of Europe and private network services providers like IBM, White said.

Big Blue provides what is probably the largest value-added network service in Europe, he said. But as the market opens up, IBM stands to lose business to the PTTs, White said.

In anticipation of that, IBM entered into the joint study with Bell Atlantic and Siemens, forming what White considered a sound strategic alliance.

"It was a good combination — IBM with their network under threat, Bell Atlantic with a lot of knowledge of what worked in the U.S. and Siemens, which probably has the ability to make [switching equipment] better, if not cheaper, than anyone else in Europe," he said.

Emergency response is one of the more ambitious services Europeans want, according to the study. Healey said it is not uncommon for cities in Europe to have three different emergency numbers, one for the police, one for the fire department and a third for ambulance service.

The new service would not only consolidate these into one number, but would incorporate features of ISDN to make the service more informative. IBM's Forner said callers would be able to have their emergency call forwarded to a doctor and, using the data path provided by ISDN lines, send a file containing their medical records at the same time.

Forner acknowledged that it may be years before the PTTs can make such services available, but he said IBM is positioning itself to supply hardware and software to the companies when the time comes.

Another potential growth area the report cites is advanced toll-free services. Although toll-free service is available in Europe today, Healey said it has limited functionality. For example, a green number call cannot cross the boundary of one country and travel into another.

By 1992, a continentwide green number service will be essential, Healey said. The service proposed in the report uses automatic number identification services, as defined by CCITT Signaling System 7 specifications, to route calls according to factors such as the day of the week, time of day or the call's origin, Forner said. Such services are already available in the U.S.

Forner expects the service will eventually include the ability to route a call to a branch of the called company located near the caller's home. Such a service is only now emerging in the U.S. ("Patented call-routing tool boon for retail industry," *NW*, Aug. 1).

One potential growth area is advanced toll-free services.

▲▲▲

He said the next step in the process is to approach each of the European public telephone companies with the report's findings, a process that has already begun.

Forner said one public telephone company, which he would not name, has signed on for a detailed study of its particular situation.

In another joint effort, the three companies will study a carrier's current technical environment, including the sophistication of its switching equipment, determine the applications customers want and develop an implementation plan for those applications, he said.

The findings of the report, which is in its final stages of preparation, will be made public in four to eight weeks, Forner said. "We're making it public because we think we can promote the general development of these services, get users interested and promote the establishment of a market [for intelligent network services]," he said. Z

Washington Update

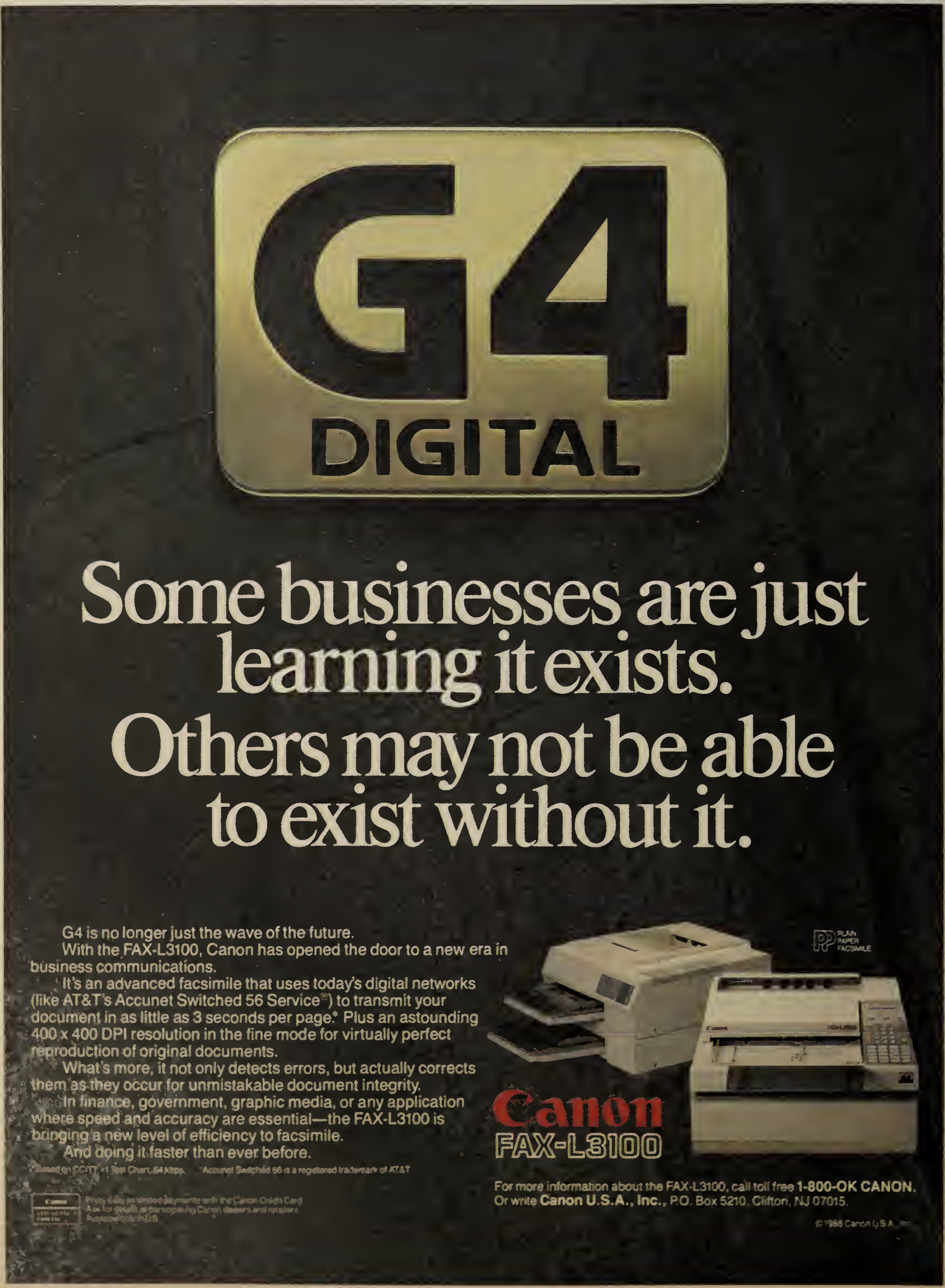
continued from page 13

U.S. District Court Judge Harold Greene to reject Nynex's request for a waiver of the Consent Decree that would allow it to provide international services.

Opponents say Nynex could use its monopoly control over the local exchange to cross-subsidize the costs of providing service and to discriminate in net access. An earlier report from the Justice Department said Nynex had failed to show that it would not act in an anticompetitive fashion if allowed to enter the international market.

Another AT&T Tariff rolls by. The FCC has allowed yet another AT&T tariff to go into effect pending an investigation into the legality of the offering. The latest proceeding involves a proposal from AT&T to provide telecommunications services to the U.S. General Services Administration at a one-year stabilized rate rather than at monthly rates.

Pacific Bell opposed the tariff, saying it is unlawfully discriminatory because it is available only to one customer in a limited number of locations. The FCC agreed that AT&T's tariff raised significant questions but declined to suspend the tariff during its investigation. Z



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Device transmits text from phone

continued from page 13

When the caller is satisfied that the message is correct, the message is converted into an ASCII format and sent to a paging switch. At that point, the message is handled in the same manner as other paging traffic — methods vary depending on the paging company involved.

Other applications

Besides the paging system, which Jedynak said CUE will begin marketing in the first quarter of next year, Riskin envisions using the system in conjunction with X.25 networks to access facsimile, E-mail, telex and other services. It has not yet been determined whether this network will be linked to CUE's nationwide satellite-based paging network.

The multiservice network Riskin is planning will eventually have workstations in more than 150 local access and transport areas, he said.

Each workstation, in turn, will be able to dial up whichever type of network the user desires — facsimile, E-mail, paging or telex — to transmit messages originating from a push-button phone.

The workstations will also be able to call a specified number and deliver a synthesized voice message, Riskin said. Or a caller can specify that the message should be delivered by paper mail, in which case the phone call would save the time it takes for a piece of mail to travel from the caller's destination to the recipient's, where it would be printed locally.

Riskin also said each user could maintain a file containing a personalized message distribution list. The file would reside on the data base nearest the user's home. Should that user travel from one city to another, the file could be called up from the workstation at the user's home base and be sent to the data base closest to where the user is staying.

"You don't need a computer. You don't need anything. You make a local call to one of our computers, tell it who you are, and the computer asks you what you want," Riskin said.

"There's no such thing as having to carry a portable office with you. Wherever you go, we're already waiting for you. You can sit in your hotel room, send faxes, send telex, dial up your personal phone list and send paper mail."

Riskin said he has filed for six patents on the Fon-Ex technology, each covering a different application of the system. ◪

Carrier Watch

continued from page 13

tems serve about 21,000 customers in seven states.

Centel originally announced its intention to buy United TeleSpectrum's cellular communications operations in early June, when Centel was busy fighting a takeover attempt led by New York investor Asher Edelman. At that time, Edelman claimed Centel agreed to pay an overly high price for the operations as a way of thwarting his takeover attempt.

Centel, however, said the purchase reflected its strategy of emphasizing three core businesses: cellular communications, cable television and local exchange telephone service.

Centel is trying to sell its business systems operation to finance the deal. ◪

20 sign on for audio message standard group

By Bob Wallace
Senior Editor

SAN FRANCISCO — Twenty new users, vendors and voice mail service bureaus joined the ranks of the Audio Message Interface Standard (AMIS) User/Vendor Council at the group's recent meeting here.

The new members include Pacific Gas & Electric Co., Ethicon, Inc. (a subsidiary of Johnson & Johnson), Hewlett-Packard Co., Ameritech, Southwestern Bell Corp., IBM, Northern Telecom, Inc. and Bell Communications Research, Inc.

The group's voice mail systems vendors were divided into two groups at the meeting. One group will examine digital networking of voice mail systems, while the other will study analog networking, according to Roger Benson, a telecommunications services technical specialist with Eastman Kodak Co.

The vendors are "not just going through the motions," Benson said. "They have been very supportive all along. We expect them to take a very hard look at each networking scheme."

The two groups will report their findings to all members at the next meeting, which will be held in Dallas Dec. 1 and 2, Benson explained.

"We hope to decide on a networking method for the AMIS specification by then, but that could take a few more meetings," he said.

Coca-Cola Co., General Electric Co., The Travelers Corp., Johnson & Johnson and Eastman Kodak, as well as five voice-mail system vendors — AT&T, VMX/Opcom, Inc., Octel Communications Corp., IBM/Rolm Systems Division and Centigram Corp. — founded the group.

Benson wants to broaden the user base of AMIS. "We really need a lot more users than we have now," he said. Amoco Corp. also joined the group this year.

Pacific Bell, a prospective voice-mail service provider, and HP, which recently bought a piece of Octel Communications, joined the group as users, Benson explained.

Users and other parties interested in joining the group should contact Robert Mercer of Hatfield Associates, Inc., a Boulder, Colo.-based consulting firm, at (303) 442-5395. ◪

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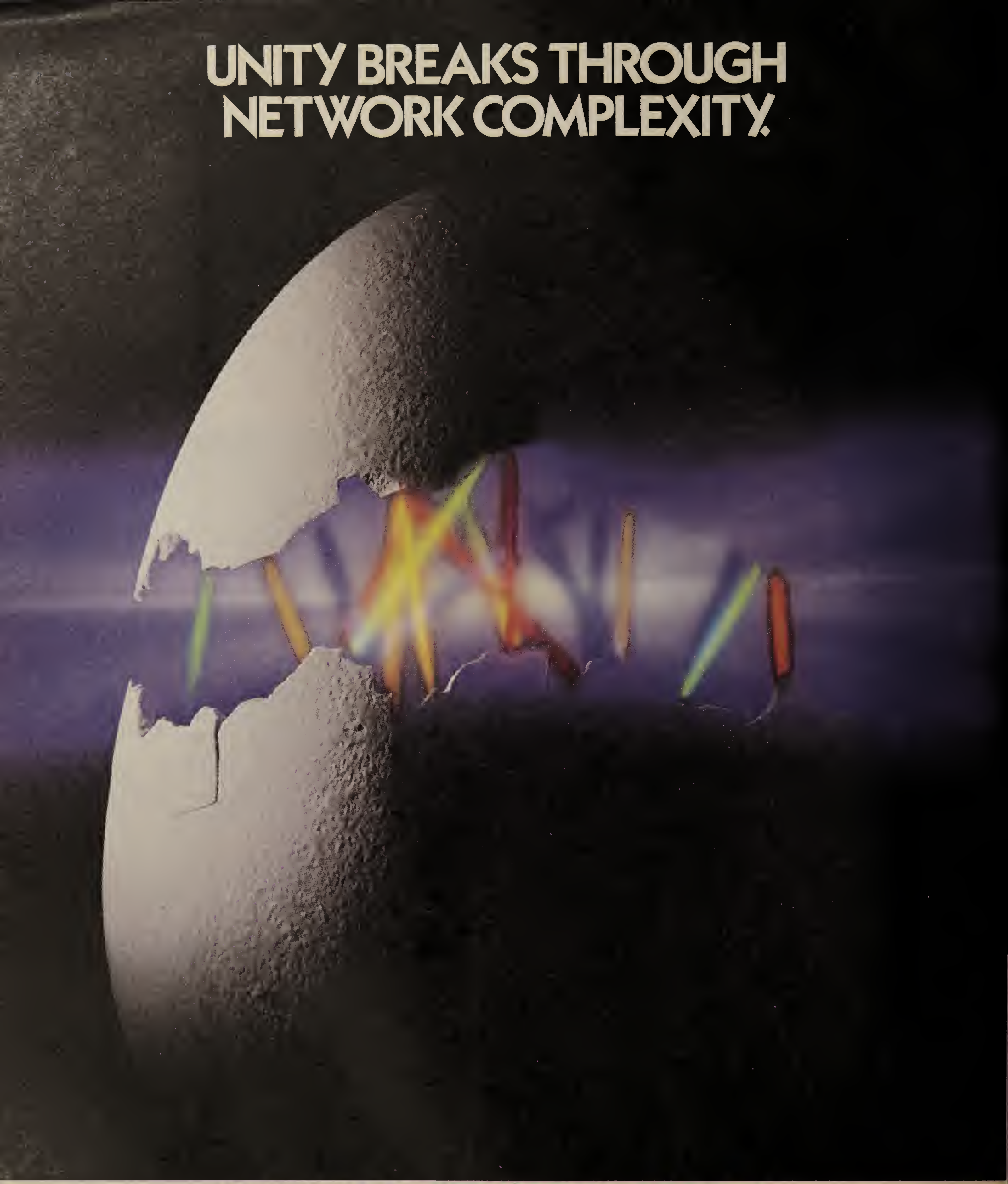

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DATA COMMUNICATIONS

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Worth Noting

> "IBM and DEC have done a good job of connecting hardware platforms. But what's missing is the high-level tool kit to connect the platforms at the application level. This is where Cullinet thinks it can make a buck."
>
> **Steven Scheidt**
> Vice-president of marketing
> Cullinet Software, Inc.
> Westwood, Mass.

Data Packets

NewBridge Networks, Inc. of Herndon, Va., recently announced a version of its T-1 network management system that supports network partitioning.

A network administrator can now divide a T-1 net into several logical partitions, each a subset of the larger physical network. Each partition can be managed and controlled locally from a terminal or workstation using a set of management and control features custom-tailored by the overall net administrator, according to the company.

The new capability is offered on the company's 4602 MainStreet Network Manager, a system based on a Sun Microsystems, Inc. workstation. The 4602 employs an approach that allows automated network control functions, such as rerouting of call connections when a line fails, between the network nodes and the central 4602 control unit. The company said the approach enables it to implement decentralized features such as partitioning while also allowing centralized management of other functions.

The partitioning capability will be available early next month.

Packet/PC, Inc. has released a new version of its Packet/3270, a communications package that runs on mi-

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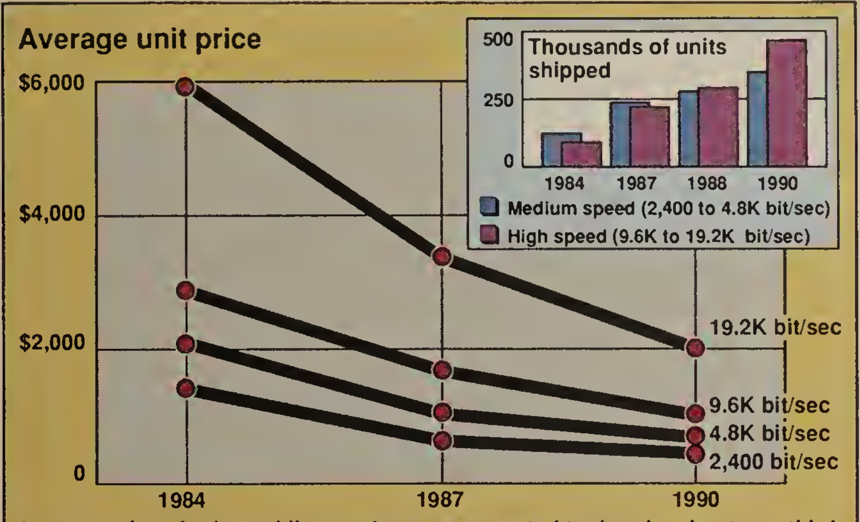
Price trends for leased-line modems



Average prices for leased-line modems are expected to drop by about one-third by 1990.

SOURCE: MARKET INTELLIGENCE RESEARCH CO., MOUNTAIN VIEW, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

NCR software lets FEPs link 3270s to applications

Users can now toggle between applications.

By John Cox
Senior Editor

ST. PAUL, Minn. — NCR Comten last week announced software that enables its IBM-compatible front-end processors to connect IBM 3270-type terminals to multiple applications on IBM and non-IBM host systems.

The Multi-Vendor Networking Facility (MVNF), available for the Comten 5620 and 5660 controllers and the 369X family, allows users to shift between applications with a single keystroke.

Because the new software runs on the company's controller instead of the host, MVNF can link with IBM Systems Network Architecture and non-SNA hosts, X.25 networks and other computers that support 3270 applications, according to Kathleen Vitalis, an NCR Comten product manager.

In addition, the software provides security features that a network manager can implement to restrict access to applications.

The company also plans to develop an interface between MVNF and IBM's NetView host-based network management software, Vitalis said. The interface will be available next year.

MVNF is a cost-effective way of enabling users to access 3270 applications that reside on multiple IBM systems or a mix of IBM and non-IBM systems, Vitalis said. The company said many customers had written their own 3270 applications and were running them on a variety of computers. One customer had three terminals on users' desks in order to provide the needed data access.

These users would need just one terminal using MVNF, selecting their application from a menu and maintaining active sessions with each, she said.

After logging into MVNF, the software displays a screen of system-related information and then presents a main menu listing available applications. Users can choose from the list using either the command line or tab and select keys. The actual logon operations are carried out by the MVNF software on the controller. A set of on-line help menus and a tutorial are included.

Vitalis acknowledged that other so-called "quick-switch" packages exist, but she said those are host-based, designed solely for IBM systems and they do not provide access to non-IBM systems.

Through the Comten 369X or 5600 communications processors, the 3270 user can be linked over a Binary Synchronous Communications path to a Sperry Corp. mainframe or through a Display System Protocol-compliant packet assembler/disassembler to hosts on an X.25 network.

In addition, the controller-based program enables network managers to change network user definitions on line without having to regenerate the system, a time-consuming process, Vitalis said.

MVNF will eventually be able to pass on to NetView information on application sessions, according to the announcement.

MVNF includes two elements, the Multiple Session Manager (MSM) and a series of host interfaces. Customers can license MSM on a monthly or yearly basis, depending on the processor used. Monthly fees range from $240 to $720. Yearly fees range from $2,640 to $7,920. The host interfaces carry an initial fee of $285, with a monthly charge of $95 or a yearly charge of $1,045.

NCR Comten, a subsidiary of NCR Corp., is located at 2700 Snelling Ave. N., St. Paul, Minn. 55113, or call (612) 638-8400. ◼

Cullinet tool kit aids application creation

Developers' helper lets users build distributed applications for IBM mainframes and micros.

By John Cox
Senior Editor

WESTWOOD, Mass. — Cullinet Software, Inc. recently announced a developers' tool kit for building distributed applications that run on IBM mainframes and microcomputers.

Comprising two products, Enterprise:Builder/PC-DOS and Enterprise:Generator/PC-DOS, the microcomputer-based tool kit allows users to create an application that can run in part on different processors, with both parts of the application exchanging data transparently, according to Steven Scheidt, Cullinet's vice-president of marketing.

Cullinet unveiled the products as part of the introduction of Cullinet Enterprise Computing (CEC), a cooperative processing scheme that uses different computers to handle portions of a single task, such as order entry.

CEC is based on a client-server architecture, in which the client portion of the application resides on a microcomputer and is linked to the server portion of the application running on a host processor. The server portion maintains shared data and common program logic.

Under CEC, applications will be able to access any ANSI standard SQL data base management system, Scheidt said.

Users of the tool kit can develop, for example, an order-entry application in which personal computer users perform data collection and validation locally. The application could involve a credit check, which would entail accessing information on a mainframe that would be passed down to the microcomputer.

The products enable application developers to create the codes that will let the microcomputer application and the mainframe application talk with each other and access information

(continued on page 20)

Touch package to use OSI to tie multivendor units

By John Cox
Senior Editor

SCOTTS VALLEY, Calif. — Touch Communications, Inc. said it will introduce today software products that enable Apple Computer, Inc. Macintosh IIs, IBM Personal Computer ATs and XTs, and Digital Equipment Corp. VAXes to communicate using Open Systems Interconnection protocols.

The products, called the Touch OSI R3.0 family, turn the microcomputers into OSI clients and the VAX into an OSI server communicating over Ethernet using OSI protocols.

The client systems can store and transparently access files on the VAX server, use an array of networked printers and communicate with other systems that support OSI or one of its subsets, Technical and Office Protocol 3.0, Manufacturing Automation Protocol 3.0 and Government OSI Profile (GOSIP), according to company officials.

The company said the new software is the first integrated product family based on 3.0, the most recent TOP standard.

Subash Bal, vice-president of marketing for Touch, said the software packages are among the few end-user OSI products on the market. Most others, he said, are implementations of the OSI protocol stack, offering little in the way of end-user capabilities.

But not many end users will be able to buy the products, at least initially. Touch is marketing them to third-party systems integrators that assemble turnkey networks for corporate and government clients. The company will also market the products to large corporations with in-house systems integration groups that are seeking either to test or implement OSI networks.

Touch OSI offers the same capabilities to all three computer systems: file access, print services, security features and support for third-party terminal emulation software.

- TouchFile allows the client microcomputers (Macintosh II, IBM Personal Computer AT, XT and compatible computers) to store files on a remote VAX running the OSI server software. The files can be accessed transparently using the commands familiar to Macintosh and MS-DOS users, according to Andy Lauta, manager of product marketing at Touch. The file capability is based on OSI's

(continued on page 20)

Cullinet tool kit aids application creation

continued from page 19

stored by each other, according to Scheidt.

The products are designed to work with Cullinet's mainframe DBMS product, IDMS/R, and its mainframe development tools, he said.

The two products are meant to be bought as a package. The developers' workstation costs $4,000, and the run-time environment costs $250. The single-copy license fee for Mainframe Server Communications, which handles communications between the cooperating processors, ranges from $8,000 to $20,000, depending on configuration. Volume discounts and site licenses are available. All products are scheduled to ship in the first quarter of 1989.

One Cullinet customer, Federal Kemper Insurance Co. of Decatur, Ill., is taking a close look at the new products, according to Keith Sievers, Federal Kemper's vice-president of information processing.

One of the company's key computer programs is an application used in determining what premium to charge for an auto insurance policy (called policy rating). The application takes into account variables such as the type of automobile, the geographic location and the applicant's age.

The company supplies a microcomputer version of the application to its independent insurance agents, who have stand-alone desktop systems. The agents use the software to rate a policy and then mail the policy to the home office. There, the mainframe version of the same application duplicates the rating process.

When the company changes such items as premium rates, two teams of programmers need to modify both the presentation logic and the programming logic in both the microcomputer and mainframe applications. This duplicated effort is costly. Sievers said he thinks the Cullinet development products may make it unnecessary.

His plan is to let agents pass information to the data center through an industry network called Insurance Value-Added Network Services (IVANS), a store-and-forward service based on IBM's value-added Information Network. Agents will send in policy application data electronically, eliminating the need to rekey it at the mainframe site.

The Cullinet development products will let the company create a single set of application specifications. From these, code can be generated automatically for the mainframe and the microcomputer programs.

In addition, Sievers noted, the Cullinet approach separates the application's presentation logic — what the agent sees and interacts with on his computer screen — from the program logic on the processor or server. The company's programmers will be able change one part of the application without affecting the other, simplifying their work, he explained.

Separating the program into client-server elements is the basis for creating a cooperative program.

If desired, Scheidt said, Federal Kemper could create a rating program that would run partly on the agent's microcomputer and partly on the mainframe, exchanging data transparently between them. Sievers said such a step is not being planned at this time.

Sievers nonetheless anticipates benefits in several areas. Business changes, such as new rates, will be reflected much more quickly in the rating application, both on the mainframe and at the desktop.

By simplifying program development and maintenance, the Cullinet software will let Sievers free up two programmers to work on other projects, he said.

As part of its implementation of the CEC architecture, Cullinet announced new versions of several existing products, which have been renamed to mark their compliance with CEC. Most of these products run on Digital Equipment Corp. VAX computers and will be available within the next few months.

Cullinet is located at 400 Blue Hill Drive, Westwood, Mass. 02090, or call (617) 329-7700. ◼

Touch package to use OSI to tie units

continued from page 19

File Transfer, Access and Management services. Files are stored on the VAX in standard VMS file formats so they also can be accessed by VMS users.

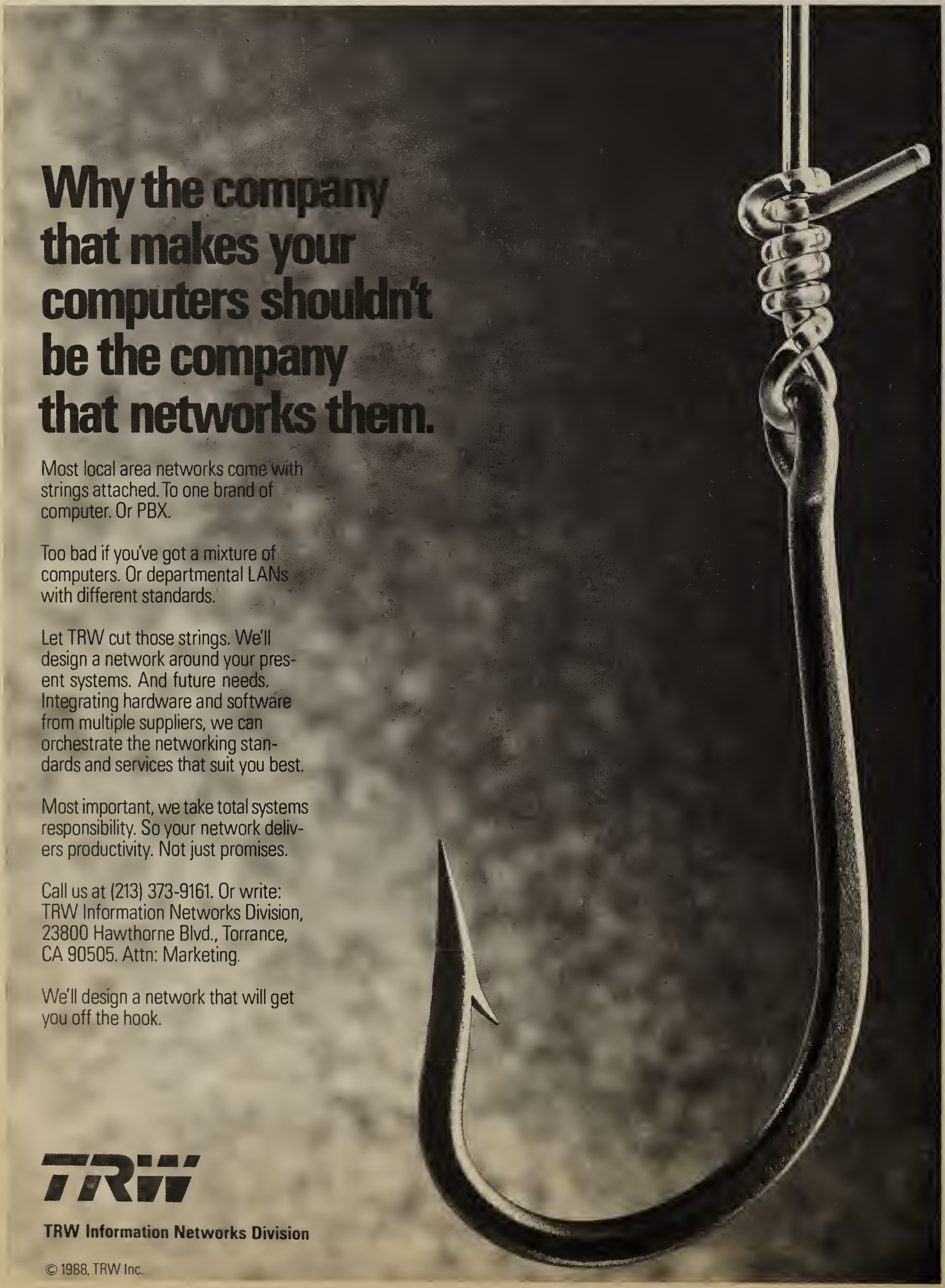
- TouchPrint takes the standard print requests of the client microcomputers and sends them out over the OSI network to remote line or laser printers.
- TouchSecurity enables DOS and Macintosh clients to use the security mechanisms found in VAX/VMS, protecting the client data stored on the VAX. This feature also allows the clients to protect their data from other network users, Lauta said.
- TouchTerminal is a feature that sends serial communications to OSI servers, enabling DOS and Macintosh terminal-emulation applications to run across the OSI network. This capability "provides DOS and Mac users with access to VMS services" such as VMSmail, Lauta said.
- TouchTerminal also acts as a virtual gateway to other networks based on DECnet or TCP/IP, he added.

The Touch OSI packages also support communications with other computers supporting MAP/TOP 3.0 or GOSIP.

Both the Touch OSI DOS and Touch OSI Macintosh software packages cost $395. Adding the Ethernet adapter increases the price for DOS to $1,340 and for Macintosh to $940. Touch OSI VMS software ranges from $3,000 to $11,000, depending on the number of users.

Touch also announced Touch OSI QuickStart Plus, an offering that includes training, software and installation of a Touch OSI net. The $9,495 package includes Ethernet controller hardware.

Touch Communications is located at 10 Victor Square, Scotts Valley, Calif. 95066, or call (408) 438-7927. ◼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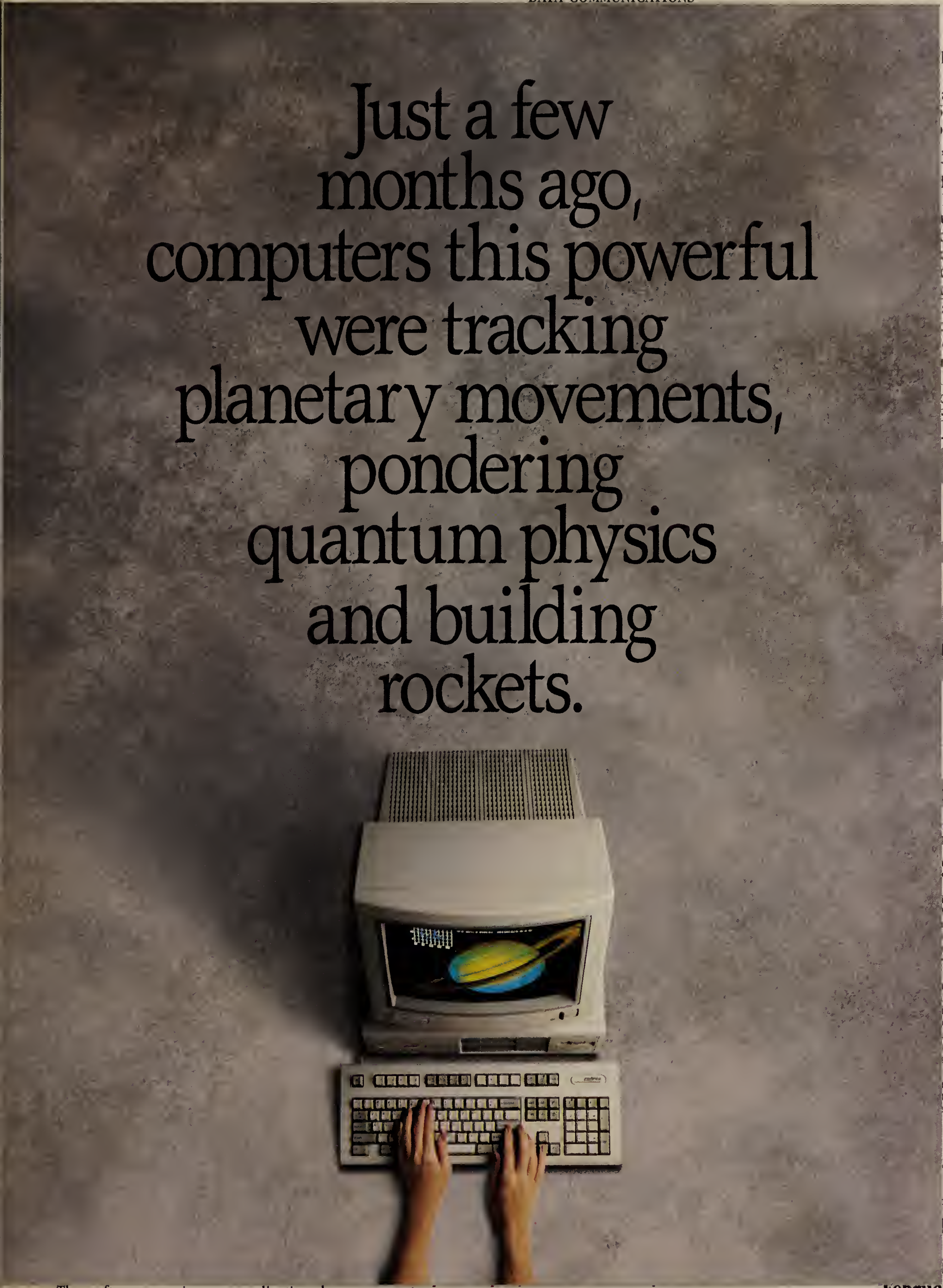
Just a few months ago, computers this powerful were tracking planetary movements, pondering quantum physics and building rockets.

The software requires no application changes on the mainframe or additional hardware changes to the personal computer, according to the company.

Packet/PC is located at 270 Farmington Ave., Farmington, Conn. 06032, or call (203) 678-1961.

CompuServe, Inc. has announced that users of its EasyPlex and InfoPlex electronic mail services can now send messages from a personal computer directly to facsimile machines worldwide.

Domestic prices for the new facsimile capability are 75 cents for the first 1,000 characters and 25 cents for each additional 1,000 characters. International prices are based on the destination country and the length of the message. ◘

he fourth algorithm chooses the first that is operational, giving a network ager the ability to create a 7200-based network with alternate routing, Ro- aum said. If a line between two nodes , the 7200 can search at once for an native path, for example, through a network node, he said.

he new address translation feature is ul when a resource such as a computer cessed by users on different public hed networks (for example, in differ- ountries), with each network identi- the computer with a different ad- s. One address label is translated into orrect format for another network to e sure the transmission arrives at the red destination.

mnet is located at 1881 Worcester d, Framingham, Mass. 01701, or call) 879-6306. ◘

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ONTEST RULES

py), clearly print your name, title, company, hone and fax numbers, and fill in the five net- in. ***All information must be provided in*** ou are not required to register for Communication in after you have registered, you will receive a

ion Networks, "See The Communications World" MA 01701-9171. Be sure to affix postage. idnight, November 15, 1988. Contest drawing will cation Networks is not responsible for entries ail. Odds of winning depend on the number of ***person.*** Entries become the property of Com-

d Prize and one (1) Third Prize will be awarded. prizes will be awarded, and winners will be individual. Prizes are non-transferable and no e allowed. Winners will be required to provide re in advertising and publicity. f the continental U.S. and Canada, 18 years of age tional Data Group, its agents, affiliates and subsid- ted, and subject to all federal, state and local laws. ication Networks, which is produced by IDG ternational Data Group Company. For a list of ssed envelope with your Entry Form.

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Yes, please enter me in your "See The Communications World" Contest and send me all the details about CN '89. I understand that I do not have to register for CN to be entered in the contest.

The five communications/network-related topics I'm most interested in are:

Just fill in this Entry Form completely, detach and mail it to:
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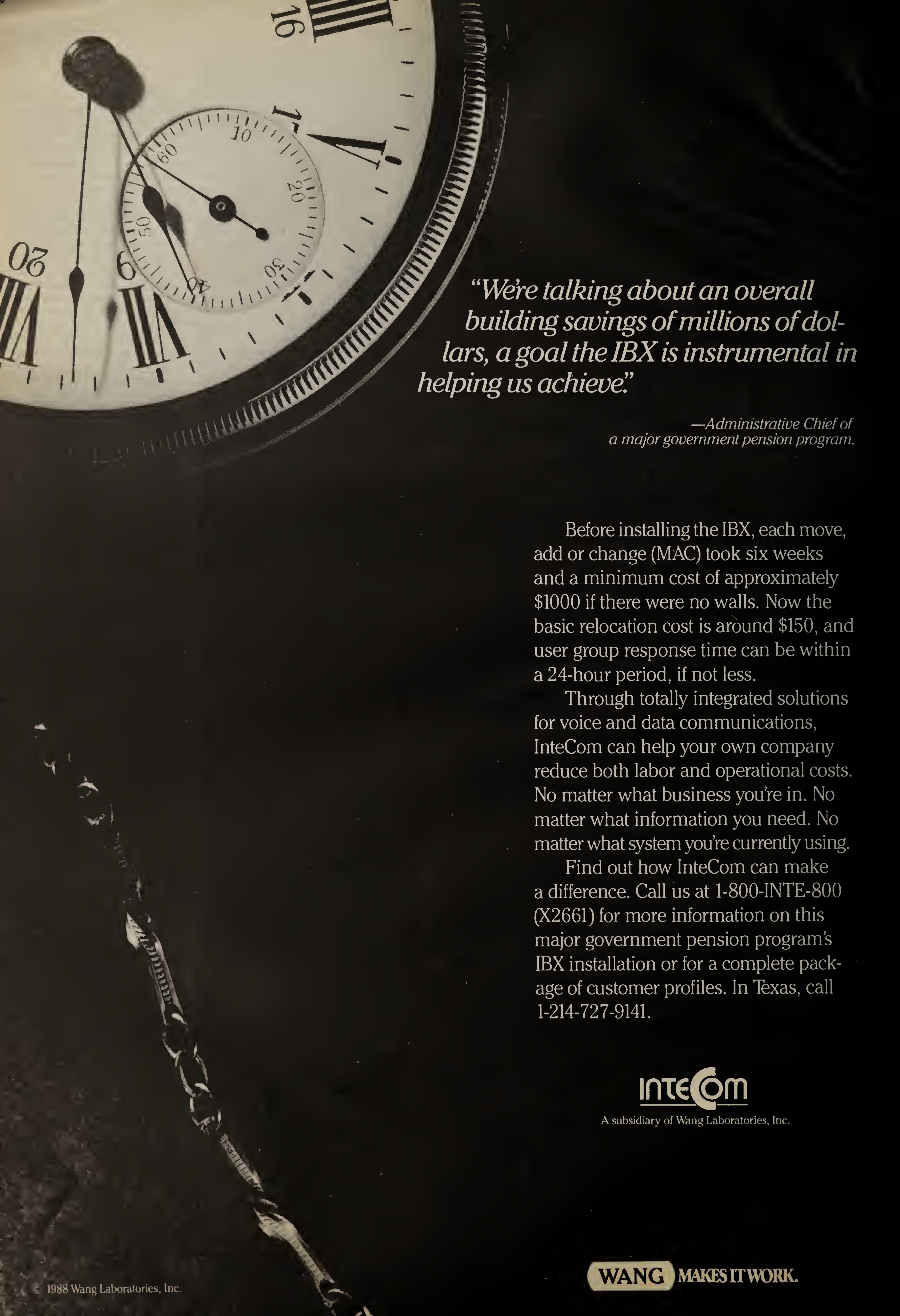
"See The Communications World" Contest
P.O. Box 9171
Framingham, MA 01701-9171



"We're talking about an overall building savings of millions of dollars, a goal the IBX is instrumental in helping us achieve."

—Administrative Chief of a major government pension program.

Before installing the IBX, each move, add or change (MAC) took six weeks and a minimum cost of approximately $1000 if there were no walls. Now the basic relocation cost is around $150, and user group response time can be within a 24-hour period, if not less.

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LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"Since June 1987, TOPS local network shipments have risen from 2,000 nodes a month to their present level of 35,000 to 40,000 nodes a month. And we don't see any end to the growth."

Richard Shapero
Vice-president/general manager
The TOPS Division
Sun Microsystems, Inc.
Alameda, Calif.

Netnotes

Tiara Computer Systems, Inc. recently introduced three Ethernet adapter cards designed for use on IBM Personal System/2 Models and Personal Computer AT-based systems.

The three new cards, called the LANcard/E * AT 16-Bit, LANcard/E * MC 16-Bit and LANcard/E * MC Twisted Pair, incorporate the latest EtherStar local-area network controller chip from Fujitsu Microelectronics, Inc.

The LANcard/E * AT 16-Bit model works with IBM Personal Computer ATs. The LANcard/E * MC 16-Bit runs on IBM Personal System/2s with the Micro Channel, including Models 50, 60, 70 and 80. The LANcard/E * MC Twisted Pair combines Micro Channel support with SynOptics Communications, Inc. unshielded twisted-pair technology. It transfers Ethernet traffic at 10M bit/sec through standard telephone cabling.

The Fujitsu controller chip makes the Tiara cards "two to three times faster" than similar Ethernet cards on the market today, claimed Richard Watson, the company's vice-president of engineering development. They also improve network throughput, he said.

As an added inducement, Tiara has backed the cards with a lifetime warranty.

All three cards are priced at $695 and are available now through distributors. For more information, contact Tiara at 2700 Garcia Ave., Mountain View, Calif. 94043, or call (415) 965-1700. ◼

Novell's Ray Noorda lays it on the line

Discusses company's networking approach, new support program and rivalry with 3Com.

In the first of a two-part exclusive interview with Network World *Senior Editor Laura DiDio, Ray Noorda, president and chief executive officer of Novell, Inc., discussed the much-publicized rivalry between Novell and 3Com Corp., Novell's approach to networking and the company's newly created Independent Hardware Manufacturers Support Program.*

Could you describe how Novell's approach to networking differs from the competition?

Our approach is to be an "any stop shop" for networking. We'll sell to [value-added resellers], systems integrators or end users. We want our products to be available from a lot of different sources.

3Com, on the other hand, takes more of a "one stop shop" approach. 3Com wants to be like Hewlett-Packard, which is where Bill [William Krause, 3Com's president] came from.

What about the much-publicized rivalry between Novell and 3Com? According to Krause, the rivalry is a thing of the past; your two companies are going in different directions. Novell, he said, is primarily a software vendor while 3Com is a complete networking vendor.

It's true that 3Com and Novell are traveling two different paths, but they're going for the one stop shop mentality while we're going for broad distribution. The revenues of the two companies are about the same; our growth is a little higher than 3Com's. We think our revenue growth will continue to accelerate and be equal to the sum of 3Com and its Bridge [Communications] division combined.

When 3Com merged with Bridge, Novell's sales volume was about the same as Bridge's, or about $53 million. I know Bridge very well because I was a founding board member and a shareholder of their stock with about

(continued on page 25)

LANMARKS

BY JOSEPH ADLER

Finding net management remedies for LANs

As local networks become an all-pervasive and essential element in the computing world, an unavoidable question confronts organizations — how do you maintain them?

This question is uppermost in the mind of network managers who maintain networks that support a broad range of applications essential to the day-to-day workings of their business. There is a growing reliance on these networks — particularly heterogeneous local-area networks interconnecting different vendors' equipment — to handle everything from financial and administrative tasks to manufacturing, engineering, and research and development applications.

Underlying this heightened concern for the health of networks is the bewildering array of physical and logical faults that can afflict them. Many of these faults can be excruciatingly difficult to identify, let alone diagnose. They include low-level problems related to the cable as well as higher level difficulties associated with communications software, troublesome network conditions and user errors.

In severe cases, problems can take a whole network down.

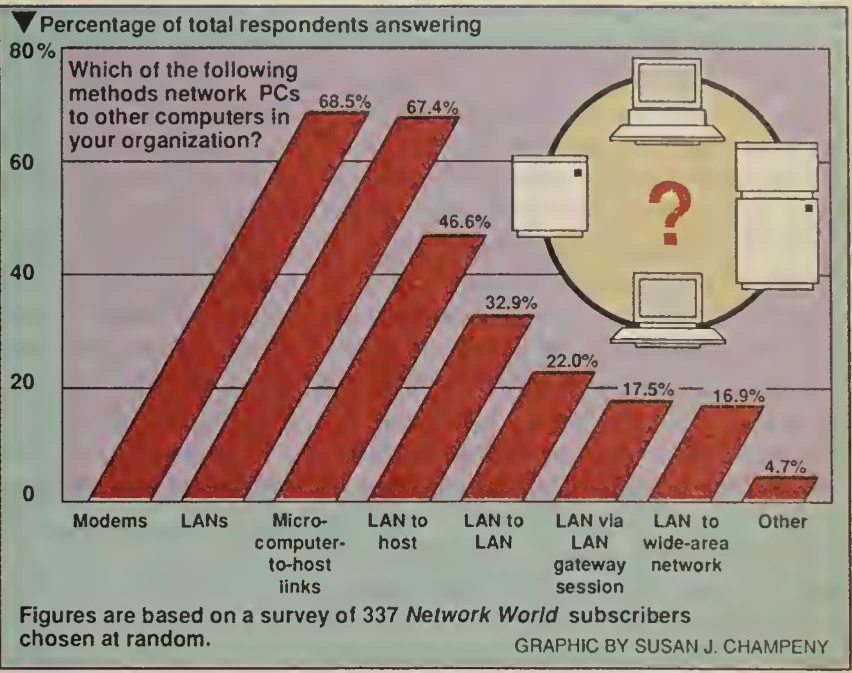
Cable troubles, in particular, occur with disturbing frequency and are far from trivial. Cables are often damaged during construction or facility maintenance and disconnected when equipment is moved.

Given the esoteric nature of local nets, more obscure but

(continued on page 24)

Adler is president of EON Systems, Inc., a manufacturer of intelligent network management systems for local networks based in Cupertino, Calif.

PC networking preferences



Figures are based on a survey of 337 *Network World* subscribers chosen at random.

GRAPHIC BY SUSAN J. CHAMPENY

Sytek pleased by UB move to token-ring MAP nets

Expects to net millions in added revenues after losing chief competitor for token-bus products.

By Laura DiDio
Senior Editor

MOUNTAIN VIEW, Calif. — Ungermann-Bass, Inc.'s decision to abandon token-bus technology as the basis for its Manufacturing Automation Protocol Version 3.0 products comes as welcome news for rival Sytek, Inc., based here.

Sytek, which expected Ungermann-Bass to be its chief competitor for token-bus MAP products in the factory environment, said Ungermann-Bass' defection to Ethernet and token-ring MAP networks will net Sytek millions in additional revenue.

"This is a big opportunity for us to gain a bigger share of the 802.4 token-bus MAP market," said Phil Edholm, Sytek's director of marketing. "We expect to realize revenues between $10 million and $30 million over the next 24 months from the sale of 802.4 token-bus and associated products."

Edholm made the token-bus revenue projections for the privately held company following a recent meeting of the MAP/TOP Users Group in Chicago. Ungermann-Bass announced at the meeting that its MAP Version 3.0 will be based on Ethernet and token ring because its token-bus MAP 2.1 product proved unprofitable ("UB gives up on token bus for MAP networks," *NW,* Oct. 3).

Some members of the MAP/TOP Users Group — most notably General Motors Corp. — were disappointed with Ungermann-Bass' abandonment of the technology, claiming the move could slow the MAP effort.

MAP Version 2.1 and the latest version, 3.0, both call for the use of the IEEE 802.4 token-bus technology as the local network transmission medium.

Michael Kaminski, manager of communications/MAP at GM, said Ungermann-Bass' action was "arrogant." GM, Kaminski said, "remains totally and completely committed to token passing as the method of transmission on the factory floor.

"The GM MAP specification only calls for IEEE 802.4 token bus; it does not address the IEEE 802.3 Ethernet standard," he said. "If Ungermann-Bass chooses to use the upper five layers of the MAP protocol on Ethernet, we can't stop them from selling the product; but they can't call it MAP. The name and the document are copyrighted by General Motors and can't be changed."

Kaminski also denied published reports that GM was throwing out existing Digital Equipment Corp. equipment because it does not meet the 802.4 token-bus standard. "What I actually said was that we are inclined to give preference to those suppliers that provide the technology we request and require — namely MAP products using the IEEE 802.4 standard.

"If vendors such as DEC choose not to provide 802.4 technology to us, then GM will buy equipment from those vendors that do produce products that adhere to the standard," Kaminski said.

Kaminski acknowleged that GM is considering replacing DEC MicroVAXes with equipment from Hewlett-Packard Co. and Motorola, Inc., among others.

GM, he said, has seven or eight plants that will be doing automation work, and as it begins to se-

(continued on page 53)

Finding management remedies for LANs

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equally disruptive conditions can also strike. In Transmission Control Protocol/Internet Protocol networks, for instance, there are protocols for helping users learn about other addresses on the network.

Unfortunately, incorrect implementations of these protocols, which result in so-called "broadcast packet storms" and "Ethernet meltdown," have occurred. In such cases, the network experiences huge bursts of activity about every 30 seconds. The result is a networkwide slowdown.

Other problematic conditions can strike at various layers of a network architecture. A peculiar condition that afflicts network-layer protocols is "black holes," routing errors that cause packets to circulate aimlessly, using up valuable bandwidth. And at the highest level, applications designed to function without a file server on a Xerox Corp. Xerox Network Systems network, for example, have been known to create excessive broadcast queries as a result of trying to access a server.

LAN remedies

Essentially, there are three product families that are available to tackle various pieces of the local net maintenance and management puzzle. They include cable testers, protocol analyzers and network management systems.

At the physical-link level of the Open Systems Interconnection network model, dedicated cable testers are available to assist in locating shorts or breaks. A number of these products, which employ a technique called time domain reflectometry, are used to approximate where trouble spots are occurring on the cable.

But from a network manager's point of view, there are some drawbacks to cable test products. First is the relatively high cost of the tools, which can reach upwards of $2,000. Second is their limited functionality. In certain tests, accuracy can range from plus or minus 40 feet on a cable, which greatly handicaps users in locating faults.

Protocol analyzers are designed to perform detailed analyses of protocol layers by capturing data packets for later examination. These tools are especially useful during the installation phase of networks for debugging purposes. Protocol analyzers are most appropriate for technicians who know what to look for at the protocol layer after problem conditions arise.

Network management systems for local networks are few and far between. They are also subject to an almost infinite variety of definitions that vary from vendor to vendor. More importantly, these systems are, out of necessity, vendor-specific because no standards have been clearly established. Therefore, in the case of mixed-vendor local networks, a network manager is forced to employ different tools in order to perform network management tasks.

In the broadest sense, net management systems should continuously monitor a network, assist in locating and diagnosing problems and help correct them quickly.

Depending upon the sophistication of available products, these systems may provide one or more data bases that can contain information on a network's components, a history of network events and a log of alarm conditions, line faults and component failures. By maintaining such information, management reports on network activity can be produced for planning purposes. Only now is the local network industry seeing the emergence of systems that can approximate this definition.

What's in store for local net management systems? Long term, the industry will see the emergence of intelligent network management systems that employ expert system and fault-tolerant technology. The ultimate goal will be the development of networks imbued with the capability of self-management, whereby the system monitors, learns, tests, diagnoses and ultimately controls itself.

Short term, the industry is witnessing the emergence of a new class of intelligent management systems that merge the vital characteristics of cable testers, protocol analyzers and network management systems into a single unit.

The intelligence found in this next generation of management systems will, in large part, be derived from embedded libraries of predefined tests and filters that automatically seek out faulty packets and performance-threatening network conditions.

The goal is to alert network administrators in advance of conditions that may lead to problems. Such built-in intelligence will allow local network managers unfamiliar with complex packet architecture or protocol standards to greatly expand their diagnostic capabilities and expedite solutions to elusive problems.

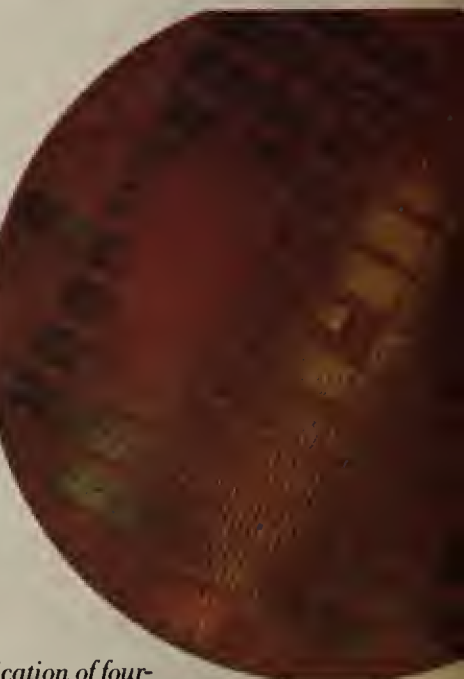
Given the escalating consequences of network downtime, continuous monitoring of a network's traffic will no doubt become imperative. By utilizing a tool that monitors the network at all times, network managers will be able to set thresholds for traffic that, if exceeded, can trigger alerts and log entries.

Rather than having to guess what information to look for after a problem appears, network managers will soon be equipped to proactively identify and immediately respond to all network problem areas.

Continuous monitoring has an additional benefit. Statistical information can be captured regarding network traffic (like error frequency and things like runts, addresses that are too short, and jabbers, addresses that are too long) in order to determine usage trends for the purpose of managing the network's efficiency and planning for future growth.

As networks multiply and become more dispersed, the need to manage them from a central point will increase. And this means remote access to distributed nets will be an essential feature of this new generation of net management systems. ◪

Invention of "thin-film" read-write technology for disk and tape storage.



First fabrication of four-million-bit memory chips.

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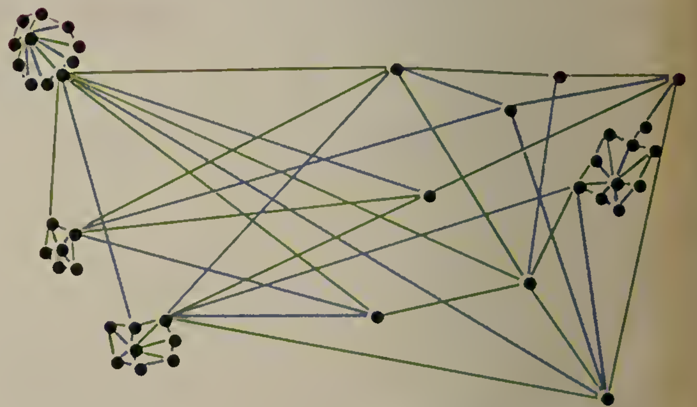

Most advanced, widely used architecture for computer networks.

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Our customers are practical people. They believe in results. And so do we.

That's why IBM technology, like that pictured here, is intended to offer solutions to our customers.

For example, our customers can file billions of characters of information and retrieve three million characters per second, for a fraction of what it cost ten years ago—thanks to IBM's leadership in disk storage systems.

Customers using relational data bases, invented by IBM, can update and retrieve data simply by telling their computers what they want to do, not how to do it.

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Novell's Ray Noorda lays it on the line

continued from page 23

1%. We don't want to be like 3Com and Bridge. We didn't start out that way, and we aren't going in that direction. The rivalry is really one of confusion between what we do and what they do.

How do you respond to critics who say that the NetWare operating system is actually a closed architecture?

The message is that there's an open and closed mind-set about what an open architecture is. We say that NetWare is designed to interface with all operating systems and all hardware systems.

The proof is in the pudding. We're supporting Apple in their environment, DEC in their environment and now we're supporting the IBM 370 VM in that environment. The best clue to what's happening is what we're demonstrating and selling. And so what people mean by open is entirely a subjective definition. Novell is interfacing with more products than any other vendor.

With the merger mania that's been rampant for the past 18 months in the local net industry, do you foresee Novell marrying anyone?

We buy into companies but mostly into software businesses involved in operating systems or related functions, like communications management or data base [management] — products that provide heterogeneity and software interfaces among many different mainframes.

We just acquired controlling interest in a company called Indisy Corp. They are a mainframe connect software business.

We certainly don't want to get into a hardware-related business at all, and we've been saying that for the past five years.

Speaking of hardware, could you tell us about the newly announced Independent Hardware Manufacturers Support Program? People at the recent Novell NetWorld 88 show felt it has yet to be fully defined.

The only responsibility that we have is the same one that we have with the Independent Software Vendor program, and that is to supply our third-party vendors with interface information and documentation support. These third-party hardware vendors want to know how they can use their hardware in the most effective way with NetWare.

What if something goes wrong with the hardware? Who's responsible?

It's got to be the third-party vendor. Novell is responsible only to the extent that we can offer guidance. The key to the program is we will also have a joint testing and application platform. We have a very extensive testing facility to test products of vendors who advertise themselves as being NetWare compatible.

We run the products through our lab, find out what's wrong and tell them how to correct any problems that occur. If, for example, NEC [America, Inc.] wants to be fully compatible with NetWare, they simply send us the product and, for a small fee, we check and certify that it is indeed fully compatible with our software. That's the reactive part.

The proactive part is the Independent Manufacturers Support Program. If a company wants to build a product that takes the fullest advantage of our System Fault Tolerant [SFT] version of NetWare, [in order] to couple some disk coprocessing functions to do various levels of SFT, we work with them and tell them what they have to do to accomplish it.

Ray Noorda

Speaking of software alliances, what went wrong with the Ashton-Tate Corp. alliance that was scheduled to be announced at NetWorld but was abruptly canceled? As we understand it, Novell and Ashton-Tate were going to form a joint technology and marketing alliance to incorporate the forthcoming dBase IV data base management system into NetWare, but Ashton-Tate bowed out because of pressure from Microsoft Corp.

There was just a change. Circumstances beyond the control of both Novell and Ashton-Tate forced the cancellation of the deal. All I can say is that the details of what happened will have to be revealed by Ashton-Tate. It's our objective to work with all software vendors. It happened that, because of the popularity of dBase IV and the significance that it would bring to distributed data base management, Ashton-Tate was a logical company for us to partner with. But when we got down to the wire, because of some unusual circumstances, we just couldn't go through with it. Technologically, it was straightforward; from a marketing standpoint, it was perfect. But there were commitments that Ashton-Tate had to maintain.

Where does this leave Novell?

There are other ways to do the same deal. It will simply take longer, that's all. We will use a different approach to get the same results both with Ashton-Tate and other data base software vendors. ◼

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Is this any way to treat your good old NCP-4 software?

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Sooner or later, the day always comes when you have to upgrade to a bigger, faster front-end processor. But these days, that's not exactly the simplest, most painless proposition around.

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Instead, you have to disturb your data center with new software. You have to interrupt who-knows-how-many critical operations. And plan on additional training costs.

That's why you should take a good look at our 4745. It lets you run NCP-4 or NCP-5, so you can change at your own pace.

Better yet, changing from one to the other is a simple procedure. If you want to get back into your familiar NCP-4 environment, it's there when you need it.

As if all that weren't enough, the 4745 also offers up to 40% higher throughput than its closest competitor. And a new approach to backup that makes more sense than anything you've seen before.

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MANAGEMENT STRATEGIES

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Worth Noting

Last year, 12% of all data processing professionals on the West Coast changed jobs, up from a low of 7% just 18 months ago, according to Edward Perlin Associates, Inc., a New York-based head-hunting firm.

Association Watch

The **National Automated Clearing House Association (NACHA)** is sponsoring a seminar entitled "Bit by Bit" in Phoenix on Nov. 3. The seminar will brief automated clearinghouse users on record formats, rule changes, rights and responsibilities of network participants and proposed system designs.

NACHA is the umbrella organization for 42 associations nationwide. These include 29 regional automated clearinghouse associations, 12 bank groups and Visa International, Inc.

The organization was started in 1974 by a group of bankers who envisioned electronic banking replacing check payments.

For more information on the seminar, call Barbara Hill at (202) 659-4343.

The **Electronic Mail Association** is gearing up for its fifth annual conference, to be held in Boston Oct. 24 and 25.

Featuring a keynote address by Ken Olsen, president and chief executive officer of Digital Equipment Corp., the conference will examine current trends and developments in the electronic messaging industry.

Among other topics, "Electronic Messaging '88" will include an overview of electronic mail by several vendor companies' chief executive officers and a look at anticipated E-mail offerings by regional Bell holding companies. For further information, write Electronic Mail Association, 1919 Pennsylvania Ave., NW, Suite 300, Washington, D.C. 20006. ◻

Most users at TCA favor freer AT&T

By Anita Taff
Senior Correspondent, Washington

SAN DIEGO — Most users interviewed at the recent TeleCommunications Association, Inc. (TCA) Annual Conference here said they favor giving AT&T greater freedom from regulations.

Questions about the manner in which AT&T should be allowed to compete were fueled by the Federal Communications Commission's recent decision to allow AT&T to proceed with its proposed Tariff 15 while the agency investigates it.

Tariff 15 allows AT&T to offer services at below-tariff prices for a customer that had been offered cut-rate service by an AT&T competitor. AT&T says it needs the flexibility of Tariff 15 to compete with other, increasingly powerful long-distance companies.

Opponents of the tariff, which include AT&T's rivals and some user organizations, say FCC approval of the tariff would effectively deregulate the long-distance carrier. Given AT&T's dominant market share, they say the carrier must still be regulated to prevent anticompetitive behavior.

Critics also claim that Tariff 15 will benefit only the largest users, while smaller companies will continue to pay higher tariffed rates for service.

Many users attending TCA said they were unconvinced by objections raised against Tariff 15. "I don't see why one company should be totally regulated when the others aren't," said Darren Thompson, chief of communications with the county of Solano in California.

He added that layers of regulation raise the cost of service for users because carriers must hire staff members to ensure that they comply with government requirements.

Thompson said he is not concerned that Tariff 15 will disadvantage small users by giving price reductions to large customers. "What difference does it make if AT&T can offer volume discounts?" he asked.

Helmut Wilp, MIS director for the West Coast Grocery Co. in Tacoma, Wash., agreed that AT&T should have more freedom. He said that since AT&T's competitors can design special low-price deals for customers, AT&T should not be held back.

> "Why restrict AT&T just because it's a dominant carrier?" Wilp asked.
>
> ▲▲▲

"Why restrict AT&T from doing business just because it's a dominant carrier?" Wilp asked.

"By regulating AT&T, MCI has the chance to get a jump on it," he said. "AT&T should have the opportunity to compete with other carriers on an even basis. After all, isn't this the land of opportunity?"

Jim Huckestein, manager of client coordination for Chevron

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ICIT produces video series on 'Competing in Time'

By Wayne Eckerson
Staff Writer

WASHINGTON, D.C. — The International Center for Information Technologies (ICIT) is producing a video series based on the best-selling book *Competing in Time: Using Telecommunications for Competitive Advantage*, by Peter Keen.

The six-part series, aimed at senior communications executives, will begin airing this winter on "The Computer Channel," a satellite broadcast business television program.

The shows will feature interviews with executives from Fortune 1,000 companies on topics taken from Keen's book. Among those slated to appear on the program are William McGowan, chairman of the board of MCI Communications Corp., and Roberta Frackman, designer of the first international banking net for Manufacturers Hanover Trust Co.

The show will consist of taped interviews with senior executives and a live segment in which callers can ask questions of Keen and his guests.

"The Computer Channel" programs are available to subscribing businesses that have satellite downlink facilities on their premises. ICIT intends to produce a commercially available videocassette based on the series sometime next year.

ICIT can be reached by writing to 2000 M Street, NW, Suite 800, Washington, D.C. 20036, or by calling (202) 659-1314. ◻

Voice system woes trip up university

University of Colorado at Boulder experiments with voice-processing system for registration.

By Rex Bowman
West Coast Correspondent

BOULDER, Colo. — The University of Colorado (UC) at Boulder learned some painful lessons from its recent attempt to allow students to register for classes through a voice-processing system.

The school had envisioned enabling students to drop or add classes from either terminals on campus or push-button phones in their dormitory rooms or homes. With a new voice-processing system, students could change course schedules by using the telephone keypad to respond to voice prompts.

"We went with the voice-processing system to provide better service to students," said David Makowski, director of systems development for UC-Boulder. "Any thought of economic benefit was secondary."

A number of other schools are exploring use of voice-processing technology to ease the registration process.

Instead of making students happy through technology, however, the university found itself facing thousands of frustrated students because the voice-processing system was unable to handle the load placed upon it.

The trouble started on Aug. 30, the beginning of a two-week period in which students were allowed to change their class schedules.

Because Aug. 30, a Tuesday, marked the eve of the fall semester, thousands of the university's 23,000 enrolled students rushed to the University Memorial Center and Events Center to drop and add classes through computer terminals there. Other students began using their push-button

(continued on page 30)

EXECUTIVE BRIEFS

Top pay. Most chief executive officers in this country will pull in salaries and bonuses that top $412,000 this year — a median increase of more than 8.1% from last year, according to a recent survey by The Conference Board, a New York-based management group.

The CEO paycheck

Industry	Median compensation (salary and bonus)	Median change from 1986 to 1987
Diversified services (24 firms)	$649,000	+14.3%
Manufacturing (224 firms)	$642,000	11.1%
Energy (31 firms)	$525,000	10.4%
Trade (33 firms)	$413,000	6.4%
Commercial banks (93 firms)	$412,000	4.9%
Insurance (91 firms)	$398,000	8.1%
Utilities (111 firms)	$355,000	8.6%

Figures are based on a survey of 607 CEOs.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: THE CONFERENCE BOARD, NEW YORK

By way of comparison, the average communications manager earned about $61,600 annually, according to a recent *Network World* survey ("Telecom managers' pay, perks on the rise," Oct. 3). Network managers saw their salaries increase an average of 7.5% in 1988. Increases in both CEO and communications manager pay have outstripped inflation, which has hovered near 4.5% for the past 18 months.

Charles Peck, a compensation specialist with The Conference Board, said CEO salary increases were higher at companies with

(continued on page 31)

▼

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Communications companies, such as Alcatel Cortelco, Alcatel PABX Systems, Alcatel Cable Systems and Alcatel Network Systems/Transcom.

For over three decades, Cortelco has established new standards of performance through the development and manufacturing of a complete line of telephones, key systems and PABXs. Today, with annual shipments of over 3 million units, Cortelco is one of the world's largest suppliers of single- and multiline telephones.

With a record of excellence spanning five decades, Alcatel PABX Systems offers premium quality products, such as the Alcatel 100 line of key systems and small PABXs, and the System 3100 voice/data PABX designed to meet the needs of companies requiring up to five hundred telephones.

A pioneer company in the development of fiber optics, Alcatel Cable Systems offers one of the industry's most extensive product lines. Including optical fiber; copper, fiber, submarine and tactical cable; and "fiber-to-the-home" systems.

Alcatel Network Systems/Transcom brings over 65 years of experience to the development and manufacturing of high-quality telecommunications, transmission and switching products.

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***Formerly ITT Business Communications Corporation and Thomson CSF Operations.

Voice system woes trip up university

continued from page 27

phones to drop and add.

The idea of placing the terminals in just two locations was also a new strategy for UC-Boulder. Previously, terminals were located in each academic department. For example, students had to walk to the physics department to drop a physics class, then walk across campus to the English department to add an English class.

But university administrators felt the phone-in system, combined with centralized computer terminals, would make the drop/add process easier for students.

"The plan was to have only the freshmen and graduate students call in on Tuesday, and the other students would be handled through the computer terminals," Makowski explained. "On Tuesday morning, it became apparent that we didn't have enough terminals. The student lines were backed up — we counted 5,600 students waiting in line — and they weren't moving very fast.

"A quick meeting was called," he continued, "and there was a decision to open up the telephone drop/add system to everybody."

In retrospect, that wasn't a very good idea. "[We thought] everybody could just go home and use the telephone to drop or add," Makowski said. "But instead of frustrated students standing in line to get to a terminal, we had frustrated students on phones hearing busy signals."

Those busy signals were due in part to the fact that the voice-processing system also supports students at the university's Colorado Springs and Denver campuses. Those students were also trying to drop and add classes by telephone.

The Perception Technology, Inc. Vocom II voice-processing system, housed on the Boulder campus, is linked to the university's mainframe via an AT&T System 85 private branch exchange. The voice-processing system supported nine lines for calls from students on the Boulder campus. Students calling from the Colorado Springs campus were given eight lines, and off-campus Boulder students and students on the Denver campus shared 39 lines.

Those lines, it turned out, were too few to handle the calls. After the university had announced that everyone could use the phone-in system, long lines began to form in front of phone booths. Meanwhile, the long lines of students waiting to get to the terminals did not go away. Some students endured waits of between six and eight hours. Many students slept outside the Memorial Center to get a good spot in line the next morning.

"It was definitely a crisis," Makowski said. "We had a situation that we needed to address very quickly. We had very frustrated, angry students standing in line without much going on. But it was also a learning experience, an acid test."

On Thursday, Sept. 1, the university added another eight lines to the voice-processing system and extended the hours for phone-in drop/add. Students were still standing in lines on Friday, but the lines were shorter and moved more rapidly.

Although they would like to forget the entire episode, the university's administrators learned a great deal from the experience. The school recently created a Drop-Add Options Committee to study where the process went wrong and how it will be handled in the future.

Byron McCalmon, associate vice-chancellor for student administrative services, was appointed chairman of the committee. According to McCalmon, the lessons UC-Boulder draws from the experience may benefit other schools.

"There are schools that have [used voice-processing systems for registration-type applications], and most of those had problems their first time," McCalmon said. "Every school that comes along thinks it won't have those problems. But it seems to be quite characteristic that you never plan for the experience you're going to have. We certainly didn't know what was going to happen to us."

Although McCalmon's committee has not yet formally proposed changes to the drop/add process, he said UC-Boulder would go back to a more decentralized approach. By removing the drop/add process from individual departments, he explained, students lost touch with their academic advisers.

For instance, when students finally arrived at a terminal and tried to add a class, they may have found it was already filled. The students were then forced to pick an alternative class, although there were no advisers nearby to help them make the best choice.

Dos and don'ts

Makowski has also come up with a list of suggestions to help schools contemplating a shift to registration via voice-processing. His suggestions include:

- Running a simulation of the registration process. For instance, UC-Boulder failed to run a simulation of the drop/add process and therefore underestimated the time it takes for a student to change his or her schedule. UC-Boulder administrators had estimated students would spend between five and 10 minutes in front of a terminal or on the phone, Makowski said, when in fact they averaged 20 minutes.
- Helping students prepare for the process. Students took 20 minutes to drop and add classes because once they found particular classes closed, they spent time flipping through catalogs in search of other classes, Makowski said. Had they had lists of alternative classes ready, the process would have gone more smoothly.
- Setting guidelines that state which students should be allowed to use the voice-processing system and at which times. This keeps the system from overloading from too many students trying to call in at the same time.
- Using as many terminals as it takes to keep long lines from forming. Makowski also agreed with McCalmon that terminals should not necessarily be grouped in one building. ◼

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Text Mail enables users with CRTs or other data terminals to send electronic memos in a similar way. It automatically formats and addresses memos — to one or many addressees — and eliminates photocopying and mailing. You can do the entire job yourself in about the same time it now takes just to dictate the message.

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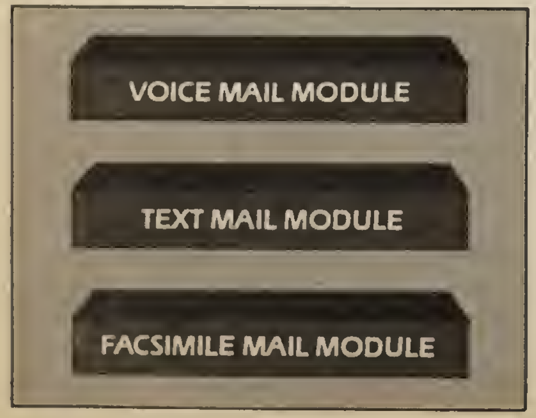

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C&C Computers and Communications

Executive briefs

continued from page 27

improved financial performance.

"The theoretical justification," he said, "is that the CEO has responsibility for company profitability. If a company has higher profits, then compensation should reflect that."

Another barometer of top executive earnings, according to Peck, is whether or not a CEO's company is regulated.

"CEOs in highly regulated industries make much less money than their counterparts in unregulated industries," Peck said. "You can see this in our results.

"CEOs in the most highly regulated industries, utilities, insurance and commercial banks (median compensation of $355,000, $398,000 and $412,000, respectively) have much lower median compensation than CEOs in the largely unregulated industries of diversified services and manufacturing," (median compensation of $649,000 and $642,000, respectively) he continued.

"The reason is that a CEO has more impact on profitability in an unregulated company than in a regulated one, where profits often are dictated by regulators," he said.

The Conference Board mailed surveys to 2,700 CEOs at midsize to large companies headquartered in the U.S. More than 600 responded.

It's crunch time. If you're worried about losing your job, you should really worry for the next month or so.

That is because more layoffs happen in the month preceding Thanksgiving than at any other time of the year, according to James Challenger, president of Chicago-based outplacement company Challenger, Gray and Christmas, Inc.

"Based on our records, layoffs increase about 10% to 15% between Oct. 15 and Nov. 15," he said. "Its definitely the biggest layoff period of the year."

Challenger said his company deals with some 600 discharged managers each quarter.

According to Challenger, layoffs increase during this period because most companies review budgets. "Discharges will usually come before Nov. 15 because employers do not want to cast a pall on anyone's holidays," he said. ◪

Most users favor freer AT&T

continued from page 27

Oil Co., said support for Tariff 15 will depend largely on the size of the user company. Large users will probably be the primary beneficiaries of cost reductions available under the tariff, he said. Consequently, "Tariff 15 will probably be a point of dissatisfaction for smaller customers."

Robert Justham, telecommunications planner for the California Department of Motor Vehicles, also dismissed criticism of Tariff 15.

"For a long time, AT&T was the only show in town. It should have the same opportunities to compete," he said.

Justham said he believes the market is competitive enough to operate with fewer regulations.

> "For a long time, AT&T was the only show in town. It should have the same opportunities to compete," Justham said.

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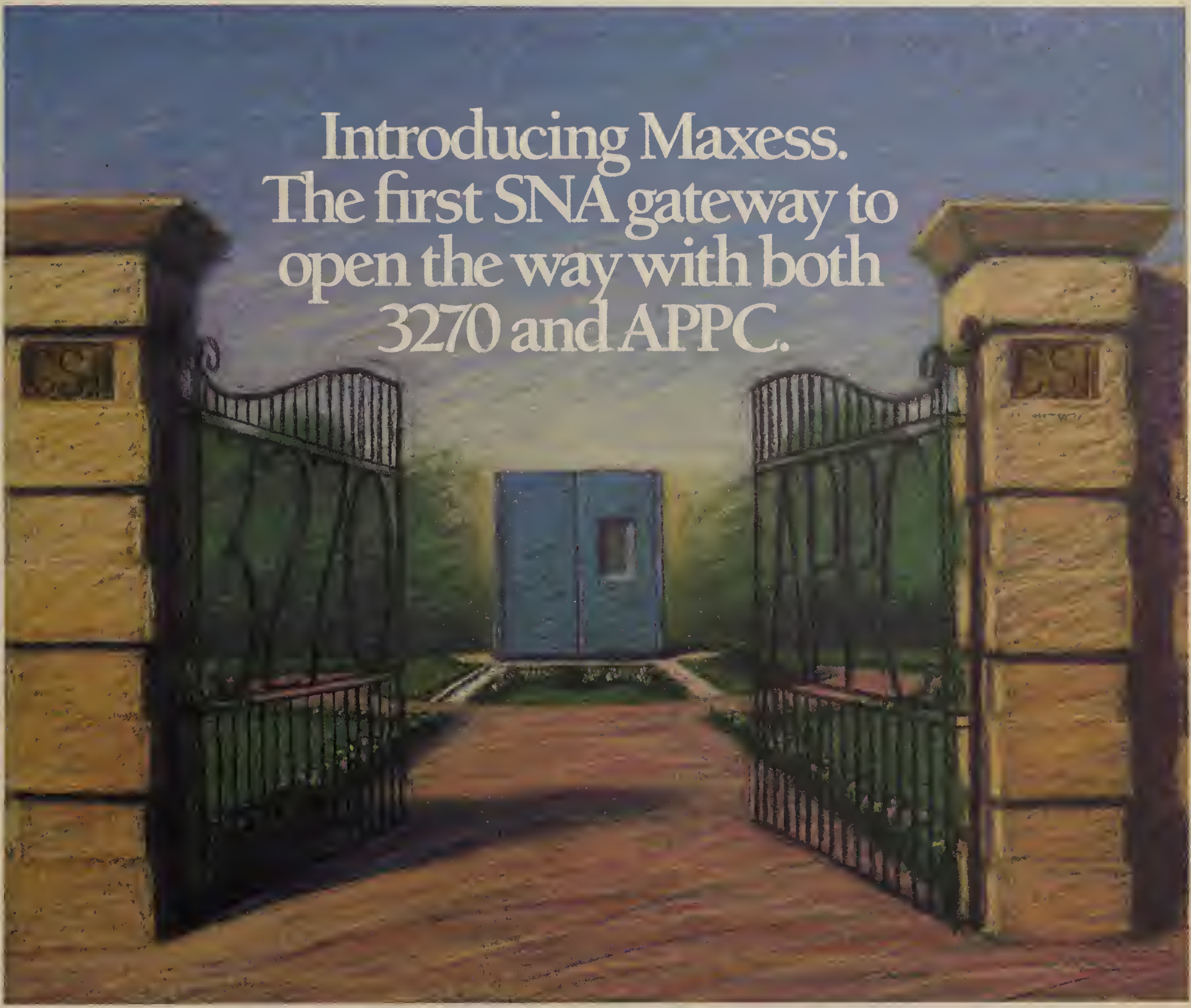
Nancy Messenger, telecommunications manager for Memorex Computer Supply in Milpitas, Calif., said she doesn't believe AT&T engages in unfair business practices and thinks that efforts to strictly regulate AT&T are misplaced.

Regulators should turn their attention to smaller providers, she said.

"They [smaller carriers] come to you with a deal that sounds good," Messenger said. "But in some cases, the service is not reliable. They're the ones that should be regulated."

However, not everyone at TCA was convinced that greater freedom from regulation for AT&T will benefit users. Roger Martens, regional sales manager for Rockwell International Corp., said that AT&T has such a big chunk of the market that restrictions on its operations are appropriate.

"Because AT&T has such a large customer base, it would be unfair for them to compete on an individual-user basis," he said. ◪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T-1 Risk Management Spotlight

The Jury-Rigged Network.

Up until it broke down, it wasn't a bad network. However, the jury is still out on who's responsible for fixing it.

If you're planning to build or upgrade your communications network, you should learn about the "Jury-Rigged Network" *before* you select a vendor.

A Jury-Rigged Network is one that was never designed or implemented within a *total* systems perspective (including comprehensive, centralized network management). A mix-and-match assortment of components, it performs at degraded levels to achieve *ad hoc* compatibility. In effect, the whole network becomes less than the sum of its parts, with its end users left to discover–as they certainly will–the weak links built into their patchwork network.

Therefore, the key to managing risk in the development of your network lies with selecting a total vendor. A vendor who holds all the pieces to the puzzle, and knows exactly what to do with them. A vendor more interested in developing a long-term strategy for your success than selling a limited range of off-the-shelf products.

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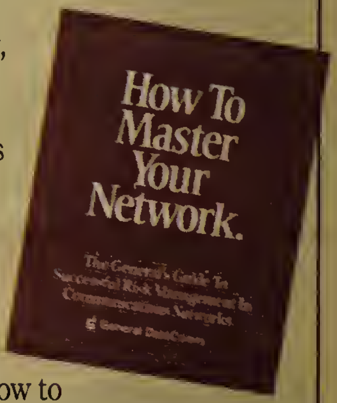
Where other communications companies farm out the development of some of their network products, or fill in the gaps with equipment from third party vendors, the General manufactures virtually all of its network equipment. That allows us to design in network integrity from the smallest system to the largest. And incorporate system-wide features that no one else can offer: backward and forward compatibility in all our network equipment; total network management from a central site, even in a DACS environment; and instantaneous and exact pinpointing of system failures, to name just a few.

To get more of the story, call the number below. We'll send you "How To Master Your Network", The General's Guide To Successful Risk Management in Communications Networks.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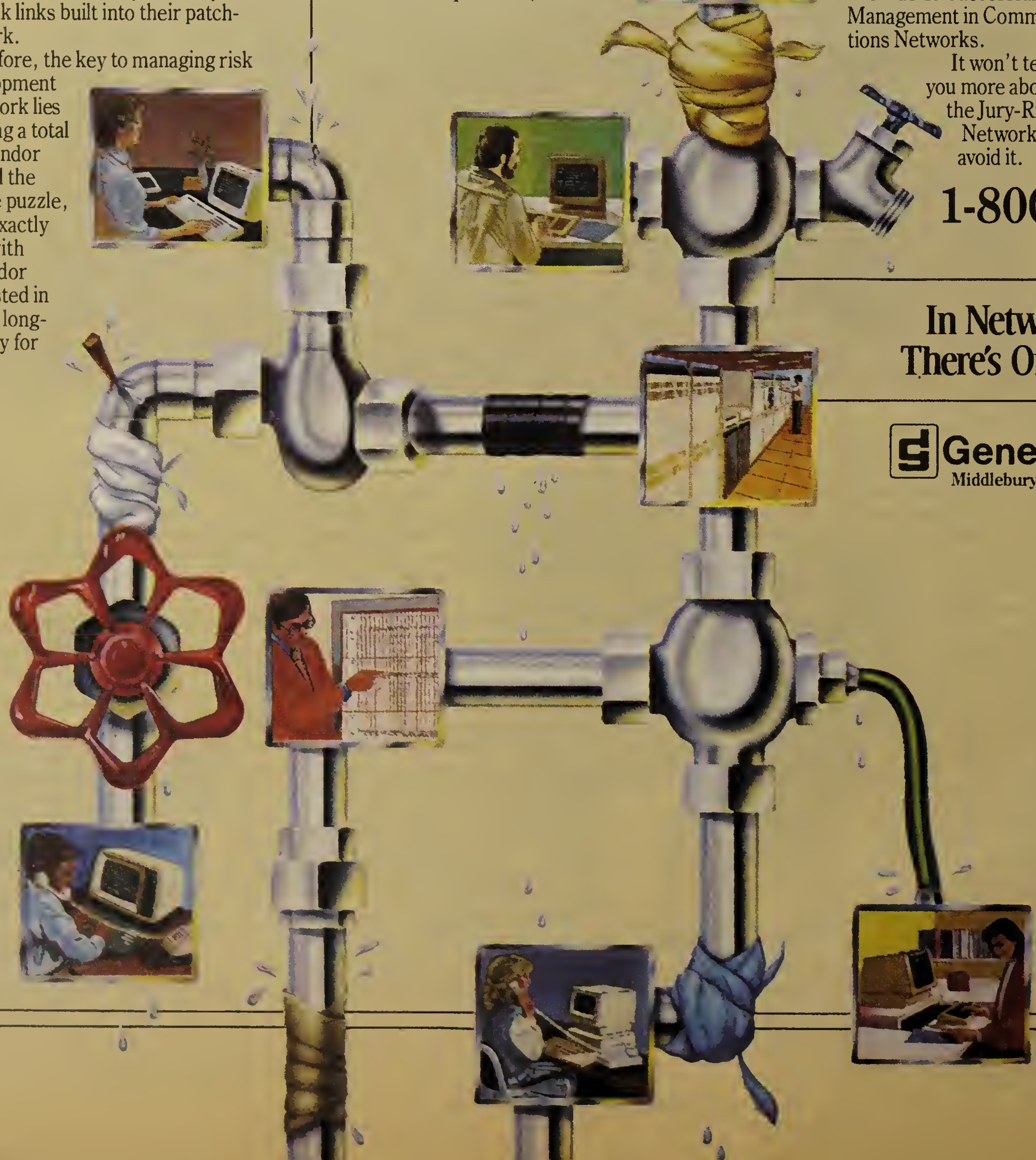

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- Products that link Honeywell Bull's DPS 6, DPS 6 Plus to Ethernets
- Mux Lab's electronic patch panel that works with twisted-pair wire
- A minisuper that acts like a network server

First Look

ISDN application development kit out

Advanced Micro Devices, Inc. recently announced a hardware and software tool kit for vendors and large end users that are developing Integrated Services Digital Network applications.

The **AmLink3** tool kit contains software required for ISDN terminal equipment to communicate directly with an AT&T 5ESS central office switch. Future versions of the software will support Northern Telecom, Inc. DMS-100 and Siemens Public Switching Systems, Inc. EWSD central office switches.

The tool kit also contains two ISDN Terminal Coprocessor boards and two Digital Exchange Controller boards with evaluation software. Each of these requires a full slot in an IBM Personal Computer, XT, AT or compatible with at least 256K bytes of random-access memory. Together, the boards simulate an end-to-end ISDN communications environment and can be used in component evaluation and software development. With the boards and software, designers can produce ISDN terminal equipment that provides voice-only, data-only or combined voice and data communications over a single link.

The software supports voice and data transfer through Layer 3 of the Open Systems Interconnection model and is independent of operating systems.

AmLink3, including a one-time license fee, complete documentation and development tools, costs $40,000. Update packages for the DMS-100 and EWSD switches will be

(continued on page 34)

DEC, AB join to develop controller

By Wayne Eckerson
Staff Writer

NEW YORK — Allen-Bradley Co. and Digital Equipment Corp. have teamed up to produce an industrial controller that speeds up the exchange of data between the factory floor and DEC applications in companywide networks.

The new controller, called the Pyramid Integrator, compiles raw data from factory floor devices into applications running under DEC's MVS operating system.

"This is the first time that enterprisewide control and information environments have been connected in a completely integrated way," said Linda Sanders, a DEC spokeswoman. "Previously, such connections required interfacing a number of different vendors' products."

The alliance represents the first time DEC has licensed a company to integrate any VAX processor for a jointly developed commercial product, DEC reported.

"It's part of DEC's ongoing strategy to team up with other leading vendors and merge our expertise in different areas," Sanders said.

"We have recognized that manufacturing is inherently a multivendor environment and no one company can provide all the answers to make computer-integrated manufacturing work," she said.

Allen-Bradley, a manufacturer of industrial automation equipment, will manufacture the Pyramid Integrator using DEC products, development expertise and marketing support.

The Pyramid Integrator, which will be sold by Allen-Bradley, is a modular system of hardware, software and communications products that monitors and regulates automated I/O equipment on the factory floor. The unit contains a MicroVAX Information Processor module, which is based on DEC VAX microchip technology and runs the MVS operating system.

The consolidation of the MicroVAX Information Processor and Allen-Bradley's logical programmable controller into one unit increases the rate at which data can travel from the factory floor to VAX applications serving MIS managers elsewhere in the company.

This increased data rate al-

(continued on page 35)

Dial-up modem for IBM PCs supports AutoSync

By Jim Brown
New Products Editor

SAN ANTONIO, Texas — Data Race, Inc. recently introduced a Hayes Microcomputer Products, Inc.-compatible asynchronous dial-up modem for IBM Personal Computers that is also capable of supporting synchronous and facsimile transmissions.

The firm's MasterModem PC is compatible with the Hayes AT command set when used for standard asynchronous communications. Other modes of operation are made possible with optional software.

Used in asynchronous mode, the modem supports full-duplex transmission and can communicate with Bell 103-compatible modems at 300 bit/sec, Bell 212A- and CCITT V.22-compatible modems at 1,200 bit/sec, and CCITT V.22bis-compatible modems at 2,400 bit/sec.

In addition, MasterModem PC supports Hayes' AutoSync software, which enables Personal Computers running AutoSync-compatible IBM 3270-type terminal-emulation software to use an asynchronous modem to communicate with an IBM host via a Systems Network Architecture network at speeds up to 9.6K bit/sec.

Data Race also announced its own AutoSync-compatible terminal-emulation software. That software enables a Personal Computer using MasterModem PC to emulate an IBM 3278 terminal, or IBM 3770 or 3780 remote job entry workstation.

The full-duplex MasterModem PC can also be used in conjunction with Data Race's Personal Computer-resident PC-Fax software to support Personal Computer-to-CCITT Group III facsimile transmissions.

PC-Fax software translates Personal Computer files to facsimile format and transmits them via MasterModem PC. In this mode, MasterModem PC operates as a CCITT V.32-compatible modem at up to 9.6K bit/sec.

PC-Fax also converts incoming facsimiles to Personal Computer files, which can be automatically printed or stored to disk.

In addition, MasterModem PC supports Data Race's built-in Remote Asynchronous Computer Extension software. This feature supports a link between ASCII terminals or Personal Computers emulating ASCII terminals and

(continued on page 34)

Software links POS with multiple nets

Package lets Stratus minis act as gateways that connect POS devices to larger systems.

By Jim Brown
New Products Editor

WASHINGTON, D.C. — Shared Financial Systems, Inc. introduced software that enables retailers to link a mix of point-of-sale devices to mainframes and credit-card authorization networks.

The company's StoreNet/2 software was released at the recent National Retail Merchants Association's (NRMA) 30th Annual Retail Information Systems Conference here.

GTE Corp. used the NRMA show to announce the formation of its Retail Information Systems division, which will market software and network services to retailers. GTE has divisions specifically aimed at marketing software and network services to the educational, health care, financial services and state and local government vertical markets.

StoreNet/2

The StoreNet/2 software runs on Stratus Computer, Inc. minicomputers, enabling the minicomputers to act as communications gateways linking POS devices to larger systems. Coupled with Stratus minicomputers, StoreNet/2 will compete against IBM's Series/1 minicomputer, which many retailers use to link POS networks to corporate IBM hosts via a backbone Systems Network Architecture network.

StoreNet/2 enables Stratus minicomputers to communicate with in-store POS controllers that support electronic cash registers via a serial loop network, such as IBM's 4680 system. It also lets the Stratus minicomputer communicate with stand-alone electronic cash registers, electronic gas pumps, automated teller machines and bar-code scanners attached to POS cash registers.

StoreNet/2 uses a polling algorithm to collect data from attached POS devices. That data is passed to a transaction-processing application, such as price lookup, running on the Stratus or to another application running on the corporate host, such as inventory management.

Through the software, the host system can download data, such as price lookup files, to remote POS controllers. StoreNet/2 also supports a messaging function that enables the host site to broadcast messages that instruct each store manager on such matters as how to price and display sale items or implement companywide policies.

StoreNet/2 also works in conjunction with other Shared Financial Systems software for the Stratus minicomputer, including ON/2 Electronic Transaction Delivery System (ON/2 ETDS). ON/2 ETDS provides direct links to private credit-card authorization networks operated by American Express Co., MasterCard International, Inc. and Visa International, Inc.

Currently, many retailers support an individual link between each store's in-store POS cash register controller and the corporate host as well as a link to third-party network services that provide access to credit-card authorization networks.

StoreNet/2 uses a polling algorithm to collect data from attached POS devices.

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To consolidate some of that traffic, users can link each store to a Stratus minicomputer running StoreNet/2 at regional centers. That Stratus minicomputer then provides the connections to either the host or to credit-card authorization networks. Likewise, users can place a Stratus minicomputer in each store and provide a single link to a host, enabling links to other nets.

StoreNet/2 actually consists of a series of terminal control program modules that support the various data formats used by such POS terminal vendors as IBM and NCR Corp. These terminal control programs convert the various incoming data formats to the data format supported by the receiving device.

The data is wrapped in a communications protocol packet by boards residing in the Stratus minicomputer. The networking protocols now supported by Stratus include asynchronous, IBM Binary Synchronous Communications, IBM Synchronous Data Link Control, IBM 2780/3780 Remote Job Entry and X.25.

StoreNet/2 also supports network management functions. The package will receive network management alarms from POS

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First Look

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available next year for $12,000 each. A stand-alone AmLink tool kit supporting Link Access Procedure (LAP) D and LAP B protocols can be ordered separately for $12,000.

Advanced Micro Devices, Inc., 5204 E. Ben White Blvd., Austin, Texas 78741, or call (512) 385-8542.

Honeywell Bull links its minis to Ethernet

Honeywell Bull, Inc. recently announced hardware and software that link its DPS 6 and DPS 6 Plus minicomputers to Ethernet local-area networks.

Honeywell Bull's **Local Area Control Subsystem (LACS)** is a DPS 6 or DPS 6 Plus minicomputer-resident local-area network controller board. The board, together with new attendant software, links those minicomputers to Ethernet networks or any network compatible with the International Standards Organization's Open Systems Interconnection model.

Used with Honeywell Bull's new Office Network Exchange (ONE) server file/print server software, LACS lets MS-DOS-based Ethernet-attached devices access DPS 6 and DPS 6 Plus disks and printers. In addition, Ethernet-attached microcomputers running new ONEpc software are able to access DPS 6 or DPS 6 Plus applications via LACS.

The LACs and file server software are available now, and prices vary depending on configuration. A LACS enabling up to eight Ethernet-attached devices to simultaneously access a DPS 6 Plus costs $5,500.

Honeywell Bull, Inc., 200 Smith St., Waltham, Mass. 02154, or call (617) 895-6733.

Baluns let users transmit over twisted-pair wire

3M Corp. recently introduced baluns that enable users of IBM 3270 and System/3X equipment as well as Wang Laboratories, Inc. minicomputers to transmit data over twisted-pair wire, instead of coaxial or twinaxial cable.

3M's **101 Coax Eliminators,** which link IBM 3270-type coaxial cable to twisted-pair wire, can be used individually on each end of a point-to-point link or in many other configurations, including a 32-port rack.

The baluns have BNC connectors for connection to IBM equipment and RJ-21 connectors for twisted pair. The maximum distance supported ranges from 1,000 to 1,500 feet, depending on the type of twisted-pair wire and configuration used.

The **108 Coax Eliminators** support data transmission from Wang systems and compatibles. The 108 Coax Eliminators can support distances up to 900 feet. The baluns use BNC, RJ-11 and screw terminal connectors.

The **110 Twinax Cable Eliminators** replace twinaxial cable in IBM System/34, System/36 and System/38 minicomputers. They can connect up to six terminals and printers in a daisy-chain configuration. The 110 Twinax Cable Eliminators can be spaced up to 3,000 feet apart. An RJ-11 jack is used for the twisted-pair wire.

All three products are available now. Prices were unavailable at press time.

3M Corp., Dept. 88-012, P.O. Box 2963, Austin, Texas 78769, or call (512) 834-3897.

Patch panel works with unshielded twisted pair

Mux Lab in Montreal recently introduced an electronic patch panel that accommodates unshielded twisted-pair wire.

Called **Muxpatch,** the product supports the eight-pin RJ-45 and six-pin RJ-12 interfaces and is available in 16- or 24-port models. Muxpatch ports can be configured to support Universal Service Order Code, AT&T and IBM/Rolm Systems Division wiring standards.

A 50-pin interface in the back of the panel attaches to a 25-pair feeder cable or patch cord. Each port is identified by a dual set of numbers.

The modular units can be stacked in a cabinet or wiring closet to provide more than 800 ports. Muxpatch fits a standard 19-in. rack and comes with a dust-proof cover.

Muxpatch is compatible with other Mux Lab IBM 3270 and System 3X products, as well as Wang Laboratories, Inc. products such as the Monorack 24, Monorack 32, W*rack 16, Twinstar and Double Octopus.

The 16-port Muxpatch is priced at $220, and the 24-port model costs $250. Both units will be available later this month.

Mux Lab, 165 Graveline St., Montreal, Quebec, Canada H4T1R3, or call (514) 735-2741.

Stellar server acts like a processor

Stellar Computer, Inc. recently announced a minisupercomputer that can act as a network server to provide processing power to engineering workstations linked in a multivendor local-area network.

The **CS1000 Computational Server** processes large computation-intensive applications for a network of workstations at 25% the cost of a typical minisupercomputer, according to the vendor. The CS1000 also serves as a file server for local-area network-attached workstations.

Users at workstations attached to Ethernet, Transmission Control Protocol/Internet Protocol or Proteon, Inc.'s ProNet networks can access applications running on the CS1000 as well as submit processing tasks requiring more power than the workstation supports. For example, the CS1000 can conduct finite element analysis, seismic/geophysical processing, computational chemistry, computational fluid dynamics, advanced image rendering and business and econometric modeling in much less time than the workstation.

In addition, workstations running Sun Microsystems, Inc.'s Network File System can use the CS1000 to store or retrieve files that are too large for a single workstation.

Running under the Stellix operating system, the CS1000 is transparent to users. The device acts as a multiuser system for up to 12 workstations tied to it via RS-232 connections.

CS1000 supports X/Windows and Stellar's Programmers Hierarchical Interactive Graphics System, a graphics library of three-dimensional interactive graphics software.

The CS1000, which supports 25 million instructions per second, is compatible with Stellar's GS1000 graphics supercomputer and runs most of the 40 software applications currently available for the GS1000. The CS1000 can be upgraded to function like the GS1000.

The CS1000 has 16M bytes of main memory, expandable to 128M bytes, and 1M byte of cache memory. The superminicomputer supports up to four internal 380M-byte or 760M-byte disks. Its SPC/386 processor monitors and diagnoses the server, and emulates an IBM Personal Computer.

A package consisting of a 150M-byte cartridge tape drive, a 1.2M-byte floppy disk, the Stellix operating system, the Stellar X/Window program, an operator console, 16M bytes of main memory and a 380M-byte disk drive costs $95,000.

The product is available now and can be delivered 90 days after an order is placed.

Stellar Computer, Inc., 85 Wells Ave., Newton, Mass. 02159, or call (617) 964-1000. ◼

Modem supports AutoSync

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ASCII hosts. The modem-resident software transmits screen updates from the host to the terminal or Personal Computer at 9.6K bit/sec while transferring terminal or Personal Computer keystrokes to the host at 200 bit/sec.

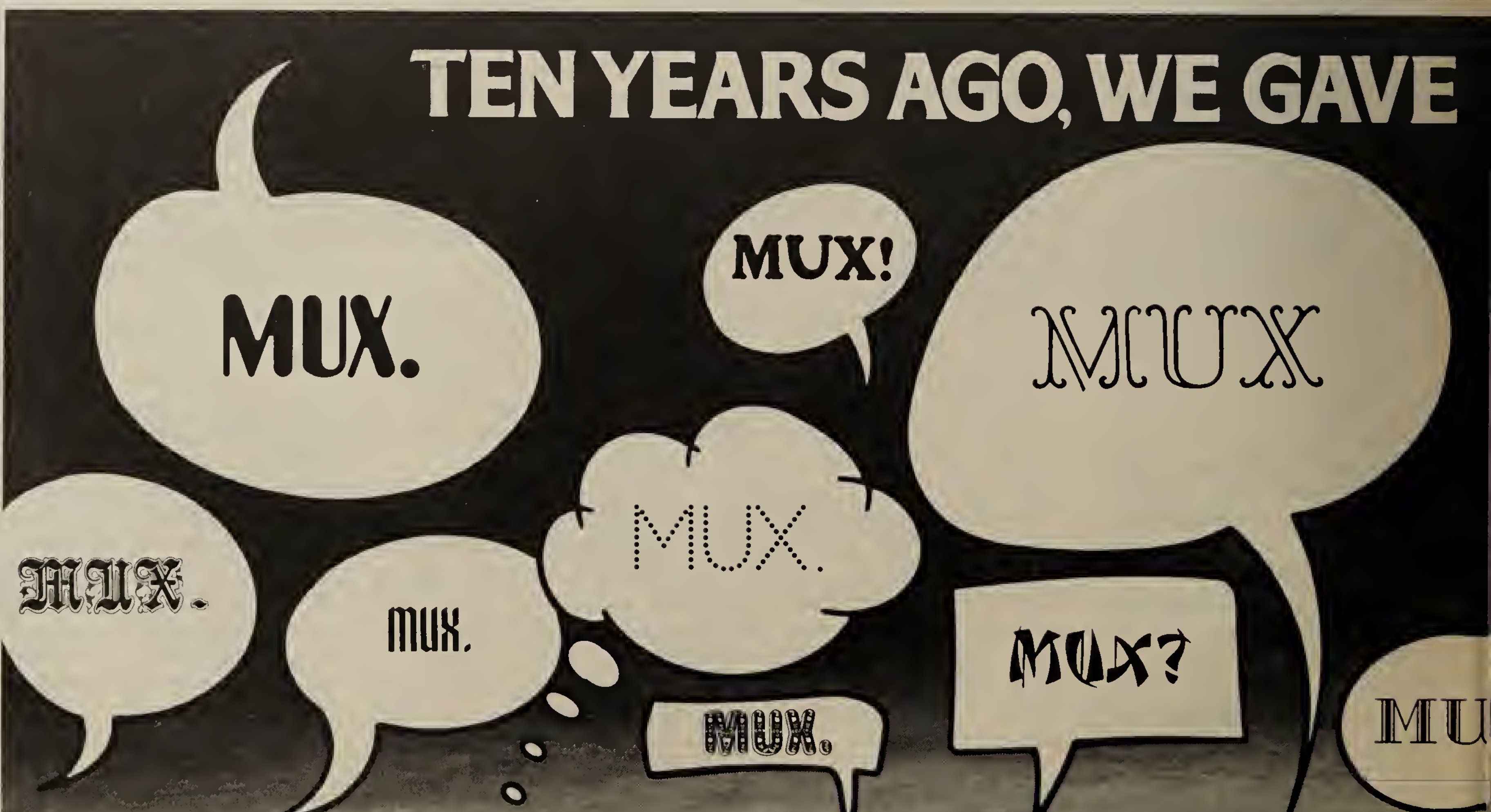
Data Race also includes its Block Mode Excelerator software with MasterModem PC. This modem-resident software makes a 9.6K bit/sec half-duplex circuit act as a full-duplex circuit and is used mostly for transferring files between Personal Computers.

MasterModem PC also supports Microcom, Inc.'s Microcom Network Protocol (MNP) Class 5 data-compression algorithm, enabling the modem to achieve a throughput rate of up to 19.2K bit/sec. MNP Class 5 translates a string of repetitive bits into a shortened code. The receiving modem, which must also support MNP Class 5, reassembles the original string of bits.

A stand-alone MasterModem PC costs $1,345, while a Personal Computer add-on board version costs $995.

The PC-Fax software costs $295, and the PC-3270-SNA software that enables the Personal Computer to support eight concurrent IBM 3278 terminal sessions costs $595. PC-3770-SNA software supporting IBM 3770 RJE workstation emulation costs $495, while PC-3780-RJE software supporting IBM 3780 RJE workstation emulation costs $395.

Data Race is located at 12758 Cimarron Path, Suite 108, San Antonio, Texas 78249, or call (512) 692-3909. ◼



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Microspace 18-in. USAT antenna out

By Jim Brown
New Products Editor

RALEIGH, N.C. — Microspace Communications Corp. recently announced an 18-in.-diameter ultrasmall aperture terminal (USAT).

USATs are nearly half the size of traditional 30-in.-diameter very small aperture terminals. Microspace's USAT is currently only capable of receiving transmissions, while VSATs support two-way transmissions.

Microspace is developing a two-way USAT and hopes to release the product next year, said Stephen Grissom, company vice-president.

The USAT can receive data from Ku-band satellites at up to 56K bit/sec. Typical applications include one-way broadcasting of electronic mail messages, transmission of financial information such as stock quotes, and distribution of radio programs and one-way voice messages.

Microspace also provides satellite transmission services for USAT users. The service requires subscribers to transmit data from their central-site facilities to a Microspace earth hub site via VSAT, microwave or land lines.

The hub site uplinks the data to General Electric American Communications' K-2 satellite, which broadcasts the data back to earth where it is received by a USAT. A receiving USAT antenna is linked either to a stand-alone receiver unit or directly to an add-on receiver board residing in an IBM Personal Computer.

Grissom said USATs are small enough to enable some users to sidestep local laws that effectively preclude the use of satellite transmission equipment. Concerned over the appearance of satellite dishes, some cities and towns have enacted laws requiring users to build screens that hide satellite dishes from public view.

A USAT can overcome those aesthetic problems because it can be mounted on the side of buildings or inside offices, Grissom said. When mounted inside an office, the USAT must be pointed toward a window. That window can be closed as long as the glass does not adversely affect the data signal.

A USAT can also be mounted atop a building with less chance of causing structural damage, Grissom said.

The USAT is priced at $900 and includes the antenna, a roof mount and a receiver. The cost of a USAT antenna, a roof mount and a Personal Computer-resident receiver board is $1,100.

While the USAT is less expensive than some VSAT offerings, Grissom said, the transmission costs will be higher than those associated with VSATs due to the fact that more satellite transmission power is needed to support smaller antennas.

Microspace was formed last March as a subsidiary of Capitol Broadcasting Co. In addition to USAT services, the company also provides VSAT services.

Microspace can be reached by writing to 711 Hillsborough St., Raleigh, N.C. 27605, or by calling (919) 890-6068.

DEC, AB develop controller

continued from page 33

lows management to monitor and change processes occurring on the shop floor. For example, a milling or metal-cutting machine can be instantaneously checked and altered to stay within prescribed tolerances determined by quality assessments, according to Peter Graham, product director at DEC.

The MicroVAX Information Processor module takes up two slots on the Pyramid Integrator's eight-slot chassis. Computerized I/O equipment on the shop floor is controlled by another module, the Allen-Bradley PLC-5/250 Programmable Controller.

> "We've had a positive response from potential customers," Sanders said.

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These two modules have shared memory, which allows information from control equipment to pass into applications available on VAX computers, Graham said. This connection creates a "data highway" that serves as the link between shop floor data and VMS applications running on VAX computers, according to Graham.

The MicroVAX processor supports DECnet on Ethernet.

The Pyramid Integrator replaces three pieces of free-standing hardware: a VAX, a protocol converter and a programmable controller, all of which usually would be connected using RS-232-C and Allen-Bradley local network products.

Besides requiring custom programming, the old setup could handle speeds only up to 9.6K bit/sec, compared with the 40M bit/sec supported by the Pyramid Integrator, said Michael Moore, an Allen-Bradley spokesman.

According to DEC's Sanders, many joint customers of DEC and Allen-Bradley have been exploring ways to connect VAX applications with controllers running shop floor equipment.

"We've had a positive response from potential customers," Sanders said. "We have done for them what they were planning to do themselves. They were relieved to learn that they do not have to invest the dollars or man-hours doing the integration on their own."

DEC and Allen-Bradley signed a nonexclusive agreement that permits the two companies to make similar arrangements with other vendors.

Officials at both companies, however, said they anticipate that their working relationship will be long-term and will generate other products.

The Pyramid Integrator will be available by the first quarter of next year. Pricing for the product will be released by the end of November.

Software links POS to nets

continued from page 33

devices and pass them along to the IBM host-based NetView network management package as NetView alerts. A StoreNet/2 enhancement due out in the first quarter of 1989 will enable a NetView console operator to issue a NetView command to resolve a problem with a POS device. That enhanced StoreNet/2 package will include a series of modules that convert NetView commands to the comparable command supported by the POS device vendor.

StoreNet/2 pricing, which includes the cost of the software and a Stratus minicomputer, starts at $300,000.

GTE Retail Information

The Tampa, Fla.-based GTE Retail Information Services division will initially sell two software products as well as transmission and data processing services offered by other GTE divisions.

The software packages, called Winning Connection and Retail Success, were developed by Choice Computer Corp., which GTE acquired last April. Both Winning Connection and Retail Success run on Unix- or Xenix-based microcomputers or minicomputers. Like StoreNet/2, Winning Connection links a mix of POS devices to larger systems. It includes modules that convert the POS device data formats to the data format supported by a receiving device.

Winning Connection also supports links to third-party vendors that provide such services as data processing or credit-card authorization. It supports IBM SNA, IBM Binary Synchronous Communications and X.25 wide-area network links.

Additionally, Winning Connection supports a network management console linked to the Unix- or Xenix-based computer. This console can control POS devices as well as convert POS network management alarms to NetView alerts and pass them to the host.

Like StoreNet/2, Winning Connection supports configurations in which a Unix- or Xenix-based computer in each store is linked directly to a host. Those in-store systems can first be linked to systems at regional centers that are also running Winning Connection.

Retail Success software is a suite of applications that helps retailers track inventory and sales as well as create pricing data bases.

The GTE division is initially targeting the software at retailers with a chain of between 30 and 50 stores. The cost of Winning Connection for a 50-store chain ranges from $10,000 to $100,000, depending on configuration. The cost for Retail Success in a 50-store chain ranges from $15,000 to $150,000, depending upon configuration.

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MARKETING STRATEGY

BY JAMES HERMAN

AT&T struggles to meet users' net management needs

AT&T is pushing hard to dislodge IBM's NetView as the de facto standard for enterprisewide network and systems management. The centerpiece of AT&T's strategy is its Unified Network Management Architecture (UNMA).

UNMA will use International Standards Organization (ISO) protocols to support information exchange between AT&T's own management systems and those of other vendors, carriers and users. Its specification for use of the ISO protocols is called the AT&T Network Management Protocol (NMP). AT&T has so far published four NMP documents, which provide one of the most detailed glimpses to date of how Open Systems Interconnection management will work.

Although AT&T's initiative in fleshing out the concepts behind ISO management is laudable, this can only be an interim measure. Achieving multivendor interoperability requires a vendor-independent definition and naming of management data. This is the major motivation for the OSI Network Management Forum, which AT&T played a major part in forming. If the members of the forum can establish a common set of OSI management definitions, they will create an industry standard that other vendors will be compelled to implement.

UNMA and NMP are not products, however, and AT&T's current set of network management products is a mixed bag. The major deficiency of AT&T's systems is that they are not capable of analyzing higher level data communications protocols; they have been aimed at physical networks that carry voice rather than data.

AT&T also lacks software distribution and remote support functions for distributed computer systems.

AT&T's public network services do not yet send real-time alarm information to private management systems, even those made by AT&T. Although there are many AT&T services that allow customers to control, configure and get reports on the network services they use, these are all structured as simple terminal access to multiple public management systems.

UNMA is supposed to fix all this, of course. UNMA and NMP will allow AT&T to tie many different public and private network management systems together. AT&T is currently working on an integrated management system that will be a customer premises system capable of integrating information from other management systems with information from public networks.

But can AT&T fill in the big holes in data network and remote system management? Its recently announced joint development agreement with Cincom Systems, Inc., the provider of Net/Master, is especially significant for two reasons. First, it gives maximum irritation to IBM, which finds Net/Master a particularly unwanted competitor of NetView. Second, it gives AT&T an essential entree into Systems Network Architecture networks without using IBM's proprietary interface. Instead, AT&T will use an NMP interface into the IBM environment.

AT&T's success hinges on two questions. First, can it really make hybrid public/private network solutions attractive and functional? If so, it will command a powerful advantage. But this could require cooperation from the Bell operating companies, which may not come easily.

Second, will the OSI movement take hold and begin to dislodge SNA? OSI will take at least two years to become real, even if the vendors supporting the OSI approach come to agreement quickly. In the meantime, IBM's offerings will continue to improve.

AT&T is making progress in the network management area and laying a foundation for strong products that meet the needs of the next two generations of networks. Whether AT&T can meet the needs of data networks, however, is far from certain.

Herman writes, teaches and consults on telecommunications technology in Cambridge, Mass.

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EDITORIAL

A house divided against itself

Our industry has two problems with implementing interconnectivity standards: vendors and users. Such standards, officially agreed upon by international associations of users and vendors, have little support in the real world. No enforcement mechanism exists to push or pull information industry companies into accepting and implementing similar communications methods for their products.

The result, of course, is chaos among users and a strong market for third-party communications software. But such software is a Band-Aid solution to a major information hemorrhage.

> Vendors' short-term tunnel vision is keeping the global village in the smoke signal stage.
>
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How much time and money are lost by companies around the world when they can't send data base files from one user's microcomputer to another's minicomputer or when their mainframes are unable to download to microcomputers located in several different cities?

At today's level of technical sophistication, it should be possible to link computers anywhere in the world at any time and simply let them work together. Vendors' short-term tunnel vision is keeping the global village in the thatch hut and smoke signal stage.

Witness the latest storm raised by major U.S. vendors over "restrictions" on private computer networks in Japan. The Japanese Post, Telegraph and Telephone administration recently proposed that all value-added networks (VAN) in that country conform to X.75, currently used around the world by AT&T and most European VANs and PTTs.

But rather than support such an important move to standardize — Japan is one of the world's largest users of communications services — several U.S. private network suppliers and the U.S. Department of Commerce attacked the idea as protectionist.

Lowell Ravesloot, director of telecommunications for IBM, was quoted as saying, "To require international standards is one way to slow down U.S. companies and allow native providers time to catch up."

But all blame cannot be laid at the vendors' feet; users must shoulder their share. Rather than raising a grass-roots rebellion and forcing vendors to comply with standards, users are finding it easier to "go along to get along."

Stories abound of users — including Fortune 100 companies — that shrink from buying communications equipment from a second vendor to avoid angering their primary vendor and losing its support. Imagine not buying a Toyota for fear of voiding the service contract on your Ford.

Standards efforts by users and vendors alike should be met with what they deserve: support and recognition. But for real progress to be made, the user community must learn to put its money where its mouth is and use economic pressure to force vendors into accepting workable international standards.

Such pressure can easily be applied via requests for proposal that insist on international standards compatibility, as well as actions by users groups and industry associations.

At the same time, vendors should finally realize that the standardized international market is almost infinitely larger than local or national markets for proprietary equipment. There is more room for competition — and profit — in a standardized world.

Vendors should keep the best parts of their operating systems, continue to develop better interconnect schemes and forge ahead on those 64-bit multitasking processors. But if these aren't based on standards that everybody can work with, they shouldn't complain if market shares begin to dwindle.

Standards are needed and available. It's up to everyone to make them work.

OPINIONS

COMPETITIVE ADVANTAGE

BY JAMES KOBIELUS

Information technology saves the world — or does it?

Someone once described England as "a nation of shopkeepers," but that label seems to fit the Pacific Rim country of Indonesia even better. Java — the main island of Indonesia — appears to be one long, riotous bazaar from end to end. Stores, stalls and peddlers carry on a fast-paced, hurly-burly business throughout the day and much of the night. This is laissez-faire, caveat emptor capitalism at its most boisterous — and nerve-racking.

Indonesians are embracing much of Western culture with great gusto, but if the domestic press is any indication, they are taking a more cautious approach with respect to information technology.

One thing noticeably missing from Indonesian articles on information technology is bubbly enthusiasm of the sort Westerners generally bring to this topic. There's next to no mention of an information age. In fact, mention of information technology as a competitive weapon comes primarily from outside, from Westerners, as in IBM's recent advertisement touting its new line of mid-range computers that appeared in the Indonesian-language newsweekly *Tempo*.

This is not to say that Indonesians are technology-illiterate or even indifferent to the role of advanced computer and communications technologies in a modern economy. On the contrary, Indonesian companies are rapidly becoming computerized, and spot satellite dishes dot office rooftops throughout the country's fast-growing capital city of Jakarta.

As evidence of official awareness, an Indonesian government minister recently cited high domestic telecommunications tariffs as a barrier to further foreign investment, which the country sorely needs to keep the economy growing at the healthy clip of the past several years.

It's clear that Indonesians consider information technology important to national economic development but not any more important than roads, electricity or other pieces of the infrastructure.

In discussions about information technology, the tone is generally one of cautious pride in incremental improvements, not buoyant anticipation of a technological cornucopia. In this, Indonesia differs little from other developing nations. The slow spadework of national development demands a balanced approach to upgrading an often substandard infrastructure. These nations have modest expectations of their telecommunications industry. Their prime concern is that it not present an impediment to economic development.

Westerners think information technology is a yellow brick road leading to sustained prosperity.

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Indonesia and other developing nations are still following the same "low-tech" development strategy they always have. For them, the road to competitive advantage has three planks: low-cost production, access to precious natural resources and close government involvement in the domestic economy.

These nations realize they have to walk before they can run, and they have to establish industrial economies for themselves before they can enter the postindustrial age. Information technology can play a supporting, but not lead, role in such a strategy.

Contrast this with the advanced economies of North America, Western Europe and the Far East. The U.S. is perhaps the premier example of a nation in which information technology is deemed central to further development as a service-oriented, postindustrial economy.

The general perception is that national competitiveness depends critically on continual improvements in installed computer and communications systems. If anything, Westerners have unrealistically inflated expectations of information technology — that it is somehow a yellow brick road leading to sustained prosperity.

In matters of national development strategy, we should give the developing nations the benefit of the doubt. There's not just one road to economic prosperity and competitive advantage, but many. Low-tech or high-tech, the proof is in the pudding.

The advanced economies should not lose sight of the fact that many Japanese firms rose to dominance on the basis of superior organization, though their information technology resources were often nothing more than a phone and a facsimile machine.

This suggests, for advanced economies, a new attitude toward the role of information technology in business. The best information technology may be the minimal appropriate technology needed to carry out the core functions of the firm.

Management strategies, not technical tools, are what drive competitive advantage. Information technology serves the company best when it doesn't present an impediment to corporate growth and development.

The dangers of taking the opposite approach, overinvesting in information technology, are well-documented. As the spendthrift 1980s come to a close, perhaps a bit of caution is justified. For every company that gained market share thanks to technology, there are several that spent too much and have nothing to show for it. Unproductive investments contribute to bloated overhead, which ultimately hurts the firm in the marketplace.

The Javanese, Indonesia's dominant ethnic group, have a saying that applies here. Regarding the notion of strategic and competitive information technology, the Javanese might see the idea as "water on the moon," something highly alluring but beyond the reach of mere mortals.

No one can deny, of course, that information technology will play an increasing business role in developed and developing nations alike. But few firms will ever attain that nirvana in which technology saves the day and the quality of management is irrelevant. ■

Kobielus consults on information technology in Alexandria, Va.

TELETOONS

BY FRANK AND TROISE

No, I thought you brought the satellite

LETTERS

The Westmoreland Effect

In your response to Roy Gottesman's letter in your Sept. 26 issue, why are you so arrogant as to "stand by your report?" That is known as "stonewalling" or "The Westmoreland Effect." My experience is that everyone can make mistakes, and in a situation such as the polyvinylchloride (PVC) one, is it not better to thank someone for a contrary view, inviting comments from other experts in the field? Too often stonewalling has led to proof of ignorance at a later date.

I would suspect that the illuminating statement by Max Planck, one of the outstanding physicists of the past century, is worth noting in this regard. He said, in effect, "A new scientific truth does not triumph by convincing its opponents [contemporaries] and making them see the light; rather it is because opponents eventually die, and a new generation eventually grows up that is familiar with it."

Keats Pullen
Life fellow
Institute of Electrical and
Electronics Engineers

We didn't mean to sound arrogant and we certainly thank Gottesman for his opposing view. Network World *solicits comments from its readers — which take the*

(continued on page 53)

Network World *welcomes letters from readers. Letters should be typed, double-spaced and sent to Editor,* Network World, *375 Cochituate Road, Box 9171, Framingham, Mass. 01701.*

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CONTINUED FROM PAGE 1

the total ACD market revenue for 1987 was $264.5 million. The stand-alone ACD market in 1987 produced $131.7 million in revenue, while the PBX-integrated ACD systems market produced $132.8 million in revenue.

Dataquest's ACD market forecast projects 9.9% compound annual growth in revenue until 1992. The revenue growth for stand-alone products will be at a higher 12% rate, while PBX-integrated products will have a lower revenue growth rate, about 7.3%. "Users will move toward the larger installations and more sophisticated approaches to telemarketing that are offered by the stand-alone products," Keeler says.

Another market research firm that follows the ACD market, Teleos Resources, Inc., of Somerset, N.J., provides a different market assessment. According to Teleos Resources President Al Fross, total 1987 ACD revenue was $353.5 million. This will jump to $667 million by 1992, he says, adding that the majority of the revenue will be on the PBX-integrated software side.

"In 1987, 62% of the total revenue was for the PBX-integrated systems," Fross says. "By 1992, the revenue for the PBX-integrated systems will increase to 74% of the total."

Teleos Resources believes that the lower cost of the PBX-integrated systems is the primary reason for their higher growth. "The average per-agent cost of a stand-alone ACD is $3,000, while the per-agent cost for the PBX-based ACD is $1,300," Fross says. "PBX manufacturers can leverage the large installed base of PBXs and just add ACD functionality at much lower cost."

Most stand-alone ACD suppliers also claim to provide PBX capabilities, and PBX vendors are willing to sell their products as fully configured stand-alone ACD systems. "Within the ACD market, PBX vendors with integrated ACD functions and the ACD vendors with integrated PBX functions are converging from opposite directions," says Paul Merideth, ACD product manager at Data Plus, Inc. in Springfield, Va. "We're a stand-alone ACD provider, but one of the features we offer is PBX functionality. Of all our systems in service, 38% are used to satisfy both PBX and ACD functions."

Emil Wang, Aspect Telecommunications Corp.'s vice-president of marketing, sees a two-tiered marketplace. "There are price-sensitive users, who typically buy PBX software, and then there are feature-sensitive users, who buy stand-alone systems," he says. "Stand-alone systems typically cost twice as much as PBX-integrated systems. With stand-alone, you are buying enormously more computing power, and that translates into more features."

Aspect Telecommunications' internal user survey shows that beyond a call center size requiring 40 to 50 agents, the ACD system cost contributes only 5% to the overall cost of operating the call center.

In terms of revenue for the stand-alone systems, Dataquest's numbers show 43.1% of the market share belongs to Rockwell International Corp., 30% belongs to Teknekron Info Switch Corp., and 20% goes to Telecommunications Technology, Inc. For PBX-integrated systems, 40% of the end-user revenue belongs to Northern Telecom, Inc., 25% belongs to AT&T, and 18% goes to IBM/Rolm Systems Division (IBM/Rolm's ACD is not listed in the accompanying chart because IBM did not respond to *Network World*'s requests for detailed product specifications).

General features

The key components of an ACD are the incoming trunks, the switch matrix, the call processor, the agent telephone sets, special supervisory sets and the call management information system.

The basic ACD functions include automatic call answering, prioritizing calls, routing calls equitably to agents, placing the call in a queue when all agents are busy, providing recorded announcements or music to queued calls on hold, overflowing a queued call to another group of agents after a preprogrammed waiting interval, and collecting and processing statistics related to a call.

Call distribution is the key feature. ACDs distribute calls on a first-in first-out basis. The agent who has handled the fewest calls gets the next call.

The agents can be grouped into functional categories (also called gates or splits). Incoming trunk groups are assigned to the agent groups. Such grouping allows departments or functions (sales vs. service) to be separately supervised, monitored and managed.

In addition to several features that may accompany an ACD (see "ACD features and functions," page 52), users should be aware of differences and how these can affect their application. "The same feature can exist on several products, but there are nuances in implementation," says Lee Duty, ACD product manager at Executone Information Systems, Inc. in Darien, Conn. "For example, wrap-up can be provided only as manual entry by agents, as an automatic systemwide forced wrap-up or as automatic wrap-up programmable by individual agents."

Another area where implementation differences can affect applications is the manner in which call overflow to a secondary or tertiary group of agents is handled and tracked. Call overflow criteria can be based on the length of time a call has been waiting or its position in a queue. For example, the fifth call in a queue or a call in queue for more than 10 seconds will overflow to a secondary group of agents. Different trunk routes and call priorities can be assigned different overflow criteria, depending on the extent of the ACD's call-routing capabilities.

Some feature-conscious systems have a look-ahead or look-back capability. Look-ahead automatically selects the best overflow queue where the call can be processed the fastest. Look-back allows the call to be sent back to any preceding group that frees up before the call is processed.

The level of overflow (or the number of groups that can be assigned for overflow) and the level of look-back can vary from system to system. Overflow and look-back can be multilevel so that the call can be overflowed to

(continued on page 43)

Sharma is president of Telesyne, Inc., a San Jose, Calif.-based telecommunications and network design firm.

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Automatic call distributors

Vendor	Models	Type	Trunk interface	Maximum port configuration	Maximum groups	Traffic capacity	Interactive processing	Networking	DNIS	Outgoing telemarketing	Real-time displays	Historical data accumulation	Custom report creation	Forecasting and scheduling	Price
Aspect Telecommunications Corp. **San Jose, Calif.**	Aspect Call Center Series (100-400R); R series with system redundancy	Stand-alone ACD	Loop/ ground, E&M, DID, T-1	408 trunks, 304 agents, 24 supervisors	64 functional, 64 trunk, 64 agent	Non-blocking switch matrix; 7,000 calls per hour	SIVM, SIAA, caller-entered coded digits, user data base directed routing through optional application bridge interface		✓	Interface to user's telemarketing system with application bridge option	CRT display, 2-sec refresh rate, electronic bulletin board option	Hourly, daily, weekly, monthly or user-specified interval	Optional with SQL DBMS	System-integrated option	Average $5,000 per agent
ATM Systems **Richardson, Texas**	SR Series	Stand-alone ACD	Loop/ ground, E&M, DID, T-1	1,376 universal ports, 512 agents, 32 supervisors	32 functional, 255 trunk, 256 agent	Non-blocking switch matrix; 24,768 CCS	VMI, AAI, ARU-integrated or interface	Overflow with call-control signaling	Optional	Full telemarketing turnkey system with Convergent Technologies, Inc. processor	Color CRT display and graphics, 6-sec refresh rate	Hourly, daily, weekly or user-selected	EMIS package on external Personal Computer AT	Optional with external Personal Computer AT	Minimum $20,000 (8 by 8 matrix, single-line sets)
AT&T **Basking Ridge, N.J.**	System 85, Release 2, Version 4	PBX-integrated, separate 3B2-based CMS	Loop/ ground, E&M, DID, T-1	6,000 trunks, 1,024 agents, 60 supervisors	60 functional, 255 trunk	Switch 50,000 call completions per hour; 10,000 to 25,000 call completions per hour for CMS; 3B processor-dependent	VMI with Audix; AAI	Four-site centralized call control with 3B/600, no central reporting	✓	Optional telemarketing software for 3B series, OCM stand-alone telemarketing system	CRT display, 10-sec and up refresh rate selectable	Daily, weekly or monthly	Custom reports generator software	Forecasting standard, scheduling optional with Names package	Minimum $25,000, including software, 3B/310 processor, two CRTs and one printer; call-vectoring features additional
	System 75, Release 2, Version 3	PBX integrated, separate 3B2-based CMS	Loop/ ground, E&M, DID, T-1	200 trunks, 200 agents, 32 supervisors	32 functional, 99 trunk	2,000 call completions per hour	VMI with Audix; AAI		✓	Optional telemarketing software for 3B series, OCM stand-alone telemarketing system	CRT display, 10-sec and up refresh rate selectable	Daily, weekly or monthly	Custom reports generator software	Forecasting standard, scheduling optional with Names package	Minimum $25,000, including software, 3B/310 processor, two CRTs and one printer
	Merlin II CMS	Full function ACD and MIS software on AT&T PC 6300/ WGS, integrated with Merlin II key system	Loop	System: 56 loop start, 72 agents; processor: 28 loop start, 28 agents	Four main groups; 2 overflow groups, 4 trunk groups	88 connections					PC monitor, continuous refresh	Daily cumulation or user-defined hourly totals	File conversion utility for data import to PC applications	Interface to Names 10 scheduling package	$8,000 for software, PC interface card
Data Plus, Inc. **Springfield, Va.**	ACD+Plus 192 (or 96) port cabinet	Stand-alone ACD	Loop/ ground	96 (48) trunks, 96 (48) agents, 8 supervisors	8 functional, 96 (48) trunk, 8 agent	Non-blocking switch matrix	VMI, SIAA, caller-entered coded digits	Overflow, no call control			CRT display, 5-sec refresh rate	Hourly, daily, weekly or monthly			$1,500 to $2,500 per agent position
Executone Information Systems, Inc. **Darien, Conn.**	Isoetec System 228; software packages: basic, dynamic, advanced, custom	PBX-integrated or stand-alone	Loop/ ground, E&M, DID	228 universal; 10 independent supervisor	25 functional, 10 trunk, 15 agent	Totally non-blocking	SIVM, SIAA, user data base-directed routing through optional CPU-to-CPU interface	Overflow, no call control		Telemarketing support through optional CPU-to-CPU interface with user's processor	CRT display, continuous refresh with dynamic, advanced and custom packages	Hourly, daily, weekly or monthly with advanced and custom packages	Integrated with custom package	Optional with separate processor	$800 to $2,000 per agent
Fujitsu Business Communications **Anaheim, Calif.**	Focus 960 with ACD, separate PC-based ACD/MIS processor	PBX-integrated	Loop/ ground, E&M, DID, T-1	160 trunks, 300 agents, 10 supervisors	50 functional, 40 trunk, 50 agent	36 CCS per line	VMI to Focus Mail, AAI	Five remote cabinets centrally controlled and managed with ACD/MIS			PC monitor; 5- to 60-sec refresh rate selectable	Hourly, daily, weekly or monthly	Files imported to PC applications		NA
	Focus 196	PBX-integrated	Loop/ ground, E&M, DID	104 trunks, 240 agents, 10 supervisors	10 functional, 63 trunk, 10 agent	36 CCS per line	VMI, AAI				Four-line, 80-character per line supervisor; telephone display; 20-sec manual refresh				NA
Fujitsu GTE Business Systems, Inc. **Tempe, Ariz.**	Starlog/ SBCS	PBX-integrated	Loop/ ground, E&M, DID	104 trunks, 240 agents, 20 supervisors	20 functional, 32 trunk, 20 agent	36 CCS per line	SIAA			Autodialing with preview					No add-on cost of ACD; $350 to $400 per line for PBX

AAI = Automated attendant interface
ACM = Automated Call Management
AP = Application Processor
ARU = Automatic Response Unit
Audix = AT&T voice-messaging system
CCMS = Customer Contact Management System
CCS = Hundred call seconds
CMS = Call Management System
CRF = Custom Reports Formatter
DBMS = Data base management system
DID = Direct-inward dialing
DNIS = Dialed Number Identification Service
EMIS = Enhanced Management Information System
ESP II = Enhanced Scheduling Package II
MPS = Man Power Planning System
Names = James River Group, Inc. software
NMS = Network Management System
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OCM = Outgoing Call Management
OPA = Operator Assist Card
RMC = Remote Management Center
SIAA = System-integrated automated attendant
SIVM = System-integrated voice messaging
SMA = Staff Management Aid
SQL = Informix Software, Inc. product
VMI = Voice-messaging interface
VRU = Voice Response Unit

(continued on page 42)

Automatic call distributors (continued)

Vendor	Models	Type	Trunk interface	Maximum port configuration	Maximum groups	Traffic capacity	Interactive processing	Networking	DNIS	Outgoing telemarketing	Real-time displays	Historical data accumulation	Custom report creation	Forecasting and scheduling	Price
Fujitsu GTE Business Systems, Inc. (continued)	Omni SIII, Omni SIV	PBX-integrated, PC Intel Corp. 80386-based external processor	Loop/ground, E&M, DID, T-1	SIII: 640 trunks, 192 agents, 8 supervisors; SIV: 1,174 trunks, 320 agents, 32 supervisors	SIII: 32 functional, 64 trunk, 8 agent; SIV: 128 functional, 640 trunk, 128 agent	SIII: 24 CCS per line, SIV: 36 CCS per line	VMI, AAI	PC processor can centrally control within engineered limits	✓	Autodialing with preview	PC CRT, color and graphics, 2-sec refresh rate	Quarter hour, hourly, shift, daily, weekly or monthly	No; custom screens with SIII		$400 to $450 per agent; $5,500 PC software; Omni SIII, $3,500 to $8,000 hardware; Omni SIV, $9,000 to $22,000 hardware
Harris Corp. Digital Telephone Systems Division Novato, Calif.	Harris 20-20 INS, Release 6	PBX-integrated	Loop/ground, E&M, DID, T-1	1,500 trunks, 384 agents, 4 supervisors	32 functional, 256 trunk, 16 agent	36 CCS per line, 15,000 call completions per hour	VMI, SIAA	Overflow, no call control	✓		CRT display 15- or 30-sec refresh rate	Half hour, daily, weekly or monthly			$1,000 to $2,000 per agent position
Intecom, Inc. Allen, Texas	S/10, S/80, S/80+	PBX-integrated	Loop/ground, E&M, DID, T-1	S/10: 1,500 trunks, 3,000 agents, 32 supervisors; S/80: 3,000 trunks, 11,000 agents, 64 supervisors; S/80+: 6000 trunks, 16,000 agents, 128 supervisors	S/10: 60 functional, 500 trunk, 60 agent; S/80: 255 functional, 4,096 trunk, 255 agent; S/80+: 255 functional, 4,096 trunk, 255 agent	Totally non-blocking	VMI, AAI	Overflow, no call control	✓	Telemarketing support through optional OAI with user's processor	CRT display, or optional adjunct processor through OAI; 10- to 60-sec refresh rate	Hourly data; optional reporting with adjunct processor through OAI	Optional adjunct processor through OAI	Optional adjunct processor through OAI	NA
Inter-Tel, Inc. Chandler, Ariz.	GX-24, GX-60, GX-120	PBX- and key system-integrated	Loop	GX-24: 12 trunks, 60 agents, 5 supervisors; GX-60: 24 trunks, 60 agents, 5 supervisors; GX-120: 32 trunks, 60 agents, 15 supervisors	GX-24: 8 trunk, 5 agent; GX-60: 8 trunk, 5 agent; GX-120: 9 trunk, 15 agent	GX-24: 398 interconnection, 9.6 CCS per line; GX-60: 908 interconnection, 9.75 CCS per line; GX-120: 1,550 interconnection, 7.8 CCS per line	Integrated with Inter-Tel voice mail SIAA				Keyset LCD, two lines, 16 characters per line; continuous refresh rate	Cumulation from last time cleared	Data base access through CRT terminal		$1,500 to $2,000 per agent
NEC America, Inc. Melville, N.Y.	NEAX 2400 IMS with optional NP50/MIS or PC-based APC/MIS	PBX-integrated; external MIS processor	Loop/ground, E&M, DID, T-1	360 agent, 14 supervisors; 63 agents, 1 supervisor with APC/MIS	32 functional, 63 trunk		VMI, AAI	Overflow; centralized control	✓		CRT with MIS processor; 60-sec refresh	Hourly, daily, weekly or monthly; 40 day storage of hourly data			NA
Northern Telecom, Inc. Dallas	Meridian SL-1 ACD packages A, B, C, MAX, D; HP Vectra-based ACD/MIS processor with MAX; DEC PDP 11-73 or 11-83 with D	PBX-integrated	Loop/ground, E&M, DID, T-1	A, B, C: 1,200 agents; MAX: 85; D: 1,000; engineered MAX supervisor with A, B, C; 8 supervisors (4 CRT) with MAX; 32 supervisors (CRT) with D; 7,000 trunks	A, B, C: 240 functional; MAX, D: 30; 128 trunk groups	Engineered for A,B,C; MAX 1,500 calls per hour; D: 7,500 calls per hour with PDP 11-73; D: 9,000 calls per hour with PDP 1183	VMI with Meridian Mail; AAI with Meridian Mail	Centralized management and control with D's NMS (approximately 10 nodes)	✓; reporting with D		MAX and D with IBM VT-220 CRT; 10-, 20-, 30-sec refresh rate with D; 30-sec refresh rate with MAX	With C, MAX and D; Half hour, daily, weekly, monthly or by shifts	Custom formatting option with D	SMA software optional with D	NA
Northern Telecom, Inc. Switching Division Nashville	DMS-100	Integrated with central office-based software, MIS on external PC at premises	Loop/ground, E&M, DID, T-1	Central office capacity, 4,000 agents total	256 functional, 2,048 trunk	Central office-based	VMI, AAI, integrated direct inbound station, access call prompter				OEM RT-100 from Perimeter Technology, Inc.	OEM RT-100 from Perimeter Technology	OEM RT-100 from Perimeter Technology	Optional from Perimeter Technology	Local carrier tariffed offering
Rockwell International Corp. Downers Grove, Ill.	GVS-050B, GVS-3000B; GVS-050B field-upgradable to GVS 3000B	Stand-alone ACD	Loop/ground, E&M, DID, T-1	3,024 universal, 1,200 agents, 116 supervisors	128 functional, 255 trunk, 116 agent	Non-blocking switch matrix; 36,000 calls per hour	VMI, AAI, VRU-integrated or interface	Centralized control and reporting, 40 sites with RMC system; remotely located agent groups	✓	Full telemarketing turnkey system with Tandem Computers, Inc. processor	CRT display standard, color graphics with external PC, 2-sec refresh rate	Daily, weekly or monthly	Optional with CRF system	Optional with MPS on PC	NA
Siemens Information Systems, Inc. Boca Raton, Fla.	Saturn PBX with ACD packages A, B, C	PBX-integrated, Personal Computer AT-based MIS AP with C	Loop/ground, E&M, DID, T-1	72 or 255 trunks, 96 agents (A, B), 200 agents (C), 4 supervisory positions with PC	64 functional, 32 trunk, 64 agent, 96 agents per group	Fully non-blocking switch; 10,000 call completions per hour; MIS AP 800 call completions per hour	VMI, AAI		✓		PC color monitor with C, 1½-sec refresh rate	Daily, weekly or monthly with C	Flat files available for PC software		NA

Automatic call distributors (continued)

Vendor	Models	Type	Trunk interface	Maximum port configuration	Maximum groups	Traffic capacity	Interactive processing	Networking	DNIS	Outgoing telemarketing	Real-time displays	Historical data accumulation	Custom report creation	Forecasting and scheduling	Price
Shared Resource Exchange, Inc. Dallas	SRX System 1	PBX-integrated	Loop/ground, E&M	255 universal, 144 trunks, 7 supervisors	255 agent, 15 trunk	Non-blocking switch matrix; 9,000 call completions per hour	VMI, SIAA	Remote systems up to 9 sites							No added software cost for ACD; $650 to $750 per line for PBX
Tadiran Electronic Industries Clearwater, Fla.	Coral PBX series	PBX-integrated with adjunct PC-based ACD and MIS software	Loop/ground, E&M, DID, T-1	360 agents, 8 supervisors, 400 trunks	64 functional, 64 trunk, 64 agent	Fully non-blocking switch matrix	VMI, AAI	Overflow, no call control		Autodial out; audio tone supervision	Color PC monitor; refresh with each new activity	User-defined totals; hourly, daily or monthly	Import files for PC applications		$12,000 plus PC hardware
Teknekron Info Switch Corp. Fort Worth, Texas	ISD/ACD Version 2 (1)	Stand-alone ACD	Loop/ground, E&M, DID, T-1	500 universal, 32 supervisors; 800 universal with dual switching units	64 (16) functional, 64 (16) trunk, 64 (16) agent	Non-blocking switch matrix; 15,000 call completions per hour	VMI, optional turnkey automated attendant, optional turnkey VRU	Centralized control and reporting for 5 sites; remotely located attendant groups	✓	Interface to user telemarketing system with ACM system; turnkey system, CCMS/target with preview dialing or CCMS/power with predictive dialing	IBM Personal System/2 or equivalent, color and graphics; 2-sec refresh rate	Half hour, daily, weekly or monthly	Standard with SQL	Optional with ESP II on IBM Personal System/2	Approximately $4,000 per agent
Telecommunications Technology, Inc. Pomona, Calif.	ECD 4000ex	Stand-alone ACD	Loop/ground; E&M, DID options	96 trunks, 96 agents, 15 supervisors	15 functional, 15 trunk, 15 agent	36 CCS per line; totally non-blocking	VMI, SIAA	Overflow, no call control	Option		CRT display, continuous refresh	Hourly, daily, weekly or monthly	PC-based information manager option	PC-based work force manager option	$2,500 per agent
	ECD 1000E	Stand-alone ACD	Loop/ground	20 trunks, 20 agents, 8 supervisors	8 functional, 8 trunk, 8 agent	36 CCS per line; totally non-blocking	VMI				CRT display, continuous refresh	Hourly, daily or weekly			$1,800 per agent
TIE/communications, Inc. Shelton, Conn.	Data Star	PBX-integrated	Loop/ground, DID	64 trunks, 192 agents, 16 supervisors	32 functional, 11 trunk	32 CCS per line	VMI, AAI with TIE AP				Single-line 16-character display, 4-sec refresh rate	Hourly cumulation; reporting with optional PC-based software			ACD software included with PBX; basic system $500 per line
	Ultracom DCX and Onyx	PBX-integrated	Loop/ground, DID	32 trunks, 60 agents, 16 supervisors	32 functional, 9 trunk	32 CCS per line	VMI, AAI with TIE AP; IAA option with OPA for DCX				Single-line 16-character display; 4-sec refresh rate				ACD software included with PBX; basic system $450 per line
VMX/Opcom, Inc. San Jose, Calif.	D.I.A.L. Release 4.2	Call-processing system with ACD in conjunction with user's PBX	Loop/ground, E&M, DID	160 trunk connections to PBX, agent positions are PBX supported	NA	NA	SIVM, SIAA	Manually routed overflow between networked systems; no call control	✓	NA		Cumulation from last time data is cleared	PC-based Admin 2.0 software		Typical $30,000 for 8 ports

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SIVM = System-integrated voice messaging
SMA = Staff Management Aid
SQL = Informix Software, Inc. product
VMI = Voice-messaging interface
VRU = Voice Response Unit

This chart includes a representative selection of vendors in the ACD market. Most vendors offer other ACDs, and many vendors not included offer a full range of competitive offerings.

SOURCE: TELESYNE, INC., SAN JOSE, CALIF.

(continued from page 40)

several groups and processed by the group where the queuing time will be the shortest.

For reporting purposes, users may find it necessary for their system to track overflowed calls by their primary group, whether or not they were processed by a secondary group.

Interactive call transactions

ACD call processing is moving toward integration with advanced voice-processing functions that give users more control over how incoming calls are treated. Most vendors will provide interfaces to separate stand-alone voice messaging, voice response and automated attendant units. These interfaces can vary from simple analog line interfaces to tightly coupled digital interfaces that allow the separate units to perform as an integrated unit.

To provide a tightly coupled interface, vendors either supply their own turnkey voice-processing units or obtain one through an OEM agreement with a preferred vendor. The latest systems are moving toward integrating these functions within the ACD itself. Data Plus' Merideth predicts that "the people who will move farthest in this area are now integrating interactive voice-processing features that enhance the basic ACD call-processing functions."

A key advantage of system-level integration is the ability of an ACD to track, monitor and collect statistics, even when the call is being handled by a voice-processing or voice-messaging system.

With voice response units, also called automatic response units, callers can be presented with information such as airline schedules, stock quotes and bank balances, again based only on push-button codes, without direct contact with an agent. Interactive call processing through caller-entered push-button codes can be further extended by prompting callers to enter pertinent information, such as account codes and area codes. These can be presented to the agent either directly or through an interface to a user-provided data base.

Caller identification

Traditionally, incoming call centers assigned different 800 numbers to different services. In the past, each number was usually served by a separate trunk group. The call was then routed to the appropriate agent group.

Long-distance carriers are now offering a service that permits different 800 numbers to be assigned to the same trunk group. This service, called dialed number identification service (DNIS), allows ACD users to obtain the trunking efficiency achievable from a single large trunk group and still be able to distinguish callers and serve them accordingly. An ACD equipped with the DNIS feature automatically makes the appropriate routing

(continued on page 48)

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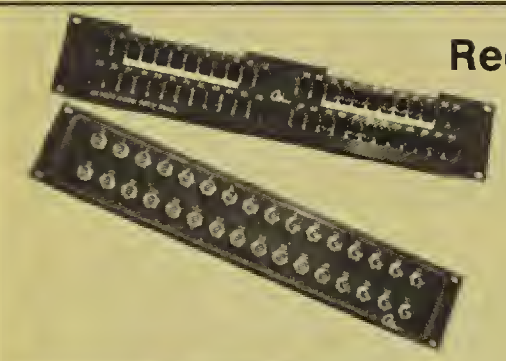

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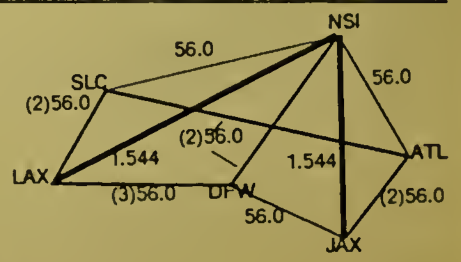

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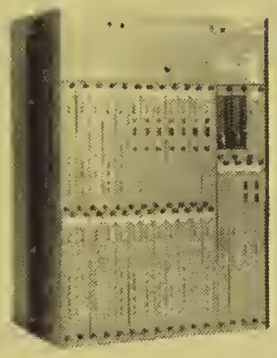

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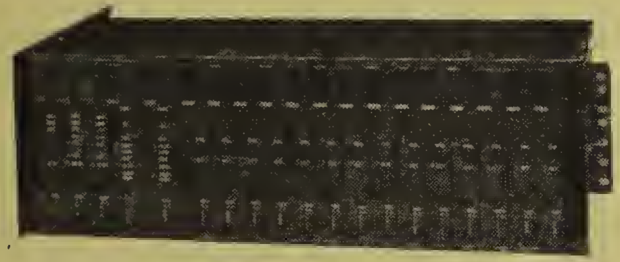

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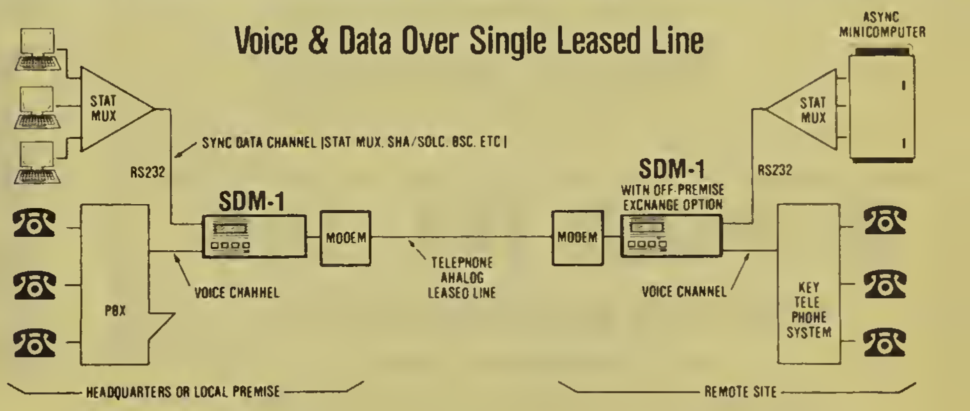
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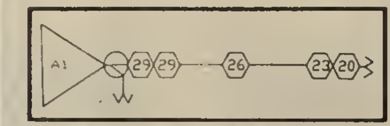

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NETWORK WORLD

A number of Management Updates, Data Comm Buyer's Guides, Telecom Buyer's Guides, PC Buyer's Guides and Industry Focuses are scheduled to run in **NETWORK WORLD** during 1988. Each of these features will focus on one aspect of the networking and communications industry and give our advertisers a chance to reach a more select audience. These are some of the topics the features will cover:

Management Updates:

Network and Communications managers gain the edge they need -- and advertisers gain a receptive audience -- from in-depth discussions of key issues in *Network World's* Management Updates. The focused editorial in these sections provides managers with invaluable assistance in planning and optimizing their networks.

* October 24 - PC Management Update: LAN Management

* November 7 - Purchasing Alternatives

* November 14 - Data Comm Management Update:
  Open Systems Networking

* November 21 - Telecom Management Update:
  Wiring and Cabling Alternatives

* December 12 - Telecom Management Update:
  Fiber Optic Systems (Early close due to Holiday)

Buyer's Guides:

Products and services are front and center in these Buyer's Guides, providing *Network World* readers -- your customers -- with the important information they need. Here's where they get the information that helps them make the most informed buying decisions for a variety of products and services.

Telecom Buyer's Guides:

* October 17 - PBX Enhancements

Industry Focuses:

This year Network World introduces a new feature that takes a close look at vertical markets with special networking needs. The Industry Focus sections are mailed directly to top decision makers in financial, retail/point-of-sale, government, travel, manufacturing, education and insurance industries, giving you added reach into these important market segments.

* October 31 - Manufacturing

* November 28 - Insurance

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* October 17 - CMA Wrap-up Issue

* November 7 - Comdex Fall Preview Issue

* November 14 - Comdex Fall Show Issue
  (Bonus Show Distribution)

* November 21 - Comdex Fall Wrap-up Issue

NETWORK WORLD publishes every Monday with an ad deadline of 12 days prior to each issue date. The October 31st Issue will be closing October 19th. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone.

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PC-based third-party ACD/MIS products

Vendor	Models	Compatibility	Data collection	Real-time displays	Historical reporting	Custom report creation	Forecasting and scheduling	Pricing
Affinitec Corp. **St. Louis**	Collector, Analyzer, Forecaster, Scheduler, other planning and analysis packages	Centrex UCD; AT&T System 75; Northern Telecom, Inc. DMS-100, DMS-200, SL-1; Rockwell International Corp. Galaxy 3000; IBM/Rolm Systems Division 8000, 9000, 9751	Raw ACD data via Collector line scanner, automatic via RS-232 PBX/ACD port	Data via Collector sent to CRT, 10-sec refresh rate	Analyzer 15 seconds to 38 months, Forecaster 2 years of 15 or 30 minutes data	Custom screens, Reportwriter, customized statistics	Intraday or interday with Analyzer, single/multiweek with Forecaster, scheduling with Scheduler using data from Forecaster	Collector from $5,000, Analyzer from $10,000, Forecaster from $3,000, Scheduler from $6,500
Cybernetics Systems International **Coral Gables, Fla.**	Employee Management and Planning System	NA	Automatic collection from an ACD printer port	NA	5-year data retention	Data imported to other applications	Daily, weekly, monthly forecasts for a range of dates; agent schedules, employee assignments	NA
HTL Telemanagement, Ltd. **Burtonsville, Md.**	ACD Designer	NA	Manual ACD traffic data entry	NA	Analysis tool for ACD optimization	NA	Forecasting analysis	Initial license $2,500, annual renewal $625
Keystone Technologies **Camp Hill, Pa.**	Scoop (Basic and Plus)	Northern Telecom Meridian SL-1 C package	Automatic via PBX RS-232 port		13 months minimum retention, daily summaries	Through SQL	Erlang C-based analysis package	DOS-based Scoop Basic $12,995, Xenix-based Scoop Plus $14,995
Monitec Systems, Inc. **Vancouver**	Monitel Orbit (Standard and Plus)	Northern Telecom Meridian SL-1 C package	Automatic via ACD management report port and supervisor CRT port	Orbit Plus with color monitor and graphics, 30-sec refresh rate	Automatic reporting hourly to quarterly, call volume retention: 3 years, 30 minutes data retention: 4 months	Files imported to PC applications	Standard with Orbit Plus	$13,999 to $19,500 for single-user version, $15,000 to $21,500 for version with 3Com Corp. LAN
Nova Systems, Inc. **Cambridge, Mass.**	ACD Reporter	IBM/Rolm 8000, 9000, 9751	Automatic via PBX quad port	Color display, 30-sec refresh rate	Retention disk size-dependent, user-selected daily or date-range reporting periods	Files imported to PC applications	Basic forecast standard, advanced forecast optional	$9,800 to $34,000
Pacecom Technologies **Bellevue, Wash.**	RMS-800 Resource Management System	NA	Emulates supervisor CRT on most ACD	Emulated ACD screens	3-year retention of weekly reports		Daily forecasting, agent schedules, budget projections up to one year in advance	$9,600
Perimeter Technology, Inc. **Nashua, N.H.**	RT-100, RT-10	Northern Telecom DMS-100 with RT-100, any ACD with RT-10	DMS-100 X.25 port with RT-100, line scanners with RT-10	Color and graphics, continuous update	1-year retention for 50 agents, 30-minute cumulation with 40M-byte hard disk, user-defined cumulation periods	Files imported to PC applications	Optional MPS	Single-user basic $25,000 to $30,000, forecasting $10,000
Professional Resource Management, Inc. **Chicago**	Agent Power, Agent Power II	Rockwell Galaxy; IBM/Rolm 8000, 9000, 9751; Northern Telecom SL-1; Telecommunications Technology, Inc. ECD 2000 and 4000	Automatic via PBX/ACD RS-232 port, manual data entry possible with Agent Power for other PBX/ACD	With Agent Power II PC color monitor and graphics, ACD-dependent refresh rate	Weekly, monthly and quarterly, 3-year retention	Files imported to PC applications	Standard	Agent Power $9,000 to $15,000, Agent Power II $15,000 to $30,000
TC Telemanagement **Tampa, Fla.**	ACD-1 Management Software, real-time display options with Q-View I and Q-View II	Northern Telecom Meridian SL-1 C package	Through a collection device connected to PBX RS-232 port	Color PC monitor with Q-View I or II, 30- or 60-sec refresh rate	Automatic generation of daily, weekly, monthly reports, user-selectable reporting periods, retention depends on PC hard disk size	Files imported to PC applications	Standard	$7,000 to $15,000
TeleCalc, Inc. **Bellevue, Wash.**	MIS System	Centrex UCD; Telecommunications Technology ECD	Line scanning devices	PC monitor, color codes, graphics, refresh with every new call	30 minutes or daily automatic reporting, retention is configuration-dependent	Through custom report templates	Standard	$25,000 to $80,000
	ACD Telemanager	IBM/Rolm 8000 and 9000 series	Automatic via PBX RS-232 port	Terminal emulation of PBX status displays, PBX-based refresh rate	6-week retention with 30 minutes or daily cumulation, 3-year retention with weekly summary cumulation	Files imported to PC applications	Optional	$9,500 to $18,000
Telecorp Products, Inc. **Southfield, Mich.**	ACD Manager	Northern Telecom Meridian SL-1 C package	Automatic via PBX RS-232 port	Color CRT, large screen TV, graphics, 30- or 60-sec refresh rate	2-year retention for 20 to 100 agents, 30 minutes cumulation, user-selected reporting periods	Files imported to PC applications	Optional with additional software package	$4,500 to $19,000 single PC system

ACD = Automatic call distributor
MPS = Man Power Planning System
NA = Information not available
PBX = Private branch exchange
SQL = Informix Software, Inc. data base management system
UCD = Uniform call distribution

This chart includes a representative selection of vendors in the personal computer-based third-party ACD/MIS product market. Most vendors offer other products, and many vendors not included offer a full range of competitive offerings.

SOURCE: TELESYNE, INC., SAN JOSE, CALIF.

(continued from page 43)

decisions by recognizing the dialed digits.

Some vendors, such as Rockwell, AT&T, Aspect Telecommunications and Teknekron Info Switch, provide a customized interface to a user's data base. Thus, caller identification is automatically passed by the ACD to the data base, allowing customized screens to show up on the agent's terminal. The agent is then prepared to answer a call from the instructions provided through customized scripts or other special instructions relevant to the type of call.

American Express Travel Related Services Co. in Phoenix uses its ACD's DNIS capability in several ways. According to Barry Wilson, manager of voice systems operation, "Our system has more than 100 DNIS numbers programmed. We have the Area Code Routing service [an AT&T tariffed service], which permits us to assign a single 800 number for all our corporate card customers nationwide. The Area Code Routing service translates the calling party's area code into a DNIS number that the ACD can use for routing and queuing decisions.

"For example, through area code translation, we can process calls differently for each time zone. Between 6 a.m. and 9 a.m. West Coast time, we can give preferential treatment to East Coast customers and take advantage of the reduced [AT&T] Megacom rates during those hours. Also, we are able to make feature availability and agent availability decisions based on the caller's geographical location.

"Additionally, I could have a single group of agents that might be handling several different products, with each product distinguished by its own DNIS. Another tariffed service where we make excellent use of DNIS is AT&T's Call Prompter. Through call prompts, the user can enter digits that are translated by the serving office to DNIS numbers that can be appropriately processed by the ACD."

ACDs that are geographically dispersed can sometimes be networked together so that calls into one city can be diverted to another city. This is especially useful in accommodating geographic time differences. For example, a call center on the East Coast can divert its calls to the West Coast during off-hours. Several vendors provide the capability to interconnect ACDs via tie lines so that calls can be programmed to overflow to another site. The overflowed call is usually processed as a brand new call by the ACD receiving it.

Only some vendors offer the capability to exchange call control parameters. This allows an ACD to pass call-specific parameters that tell the receiving ACD how to handle the incoming call.

Some vendors allow independent, networked ACDs to be centrally monitored and controlled. This lets a hub location monitor and control the whole network and collect statistics and reports on network performance as well as individual ACD performance. Another useful distributed call-processing feature offered by some vendors is the ability to distribute agent groups geographically. Equipment can be placed remotely and tied to the central unit via T-1 links (see the chart on page 41 for a sample listing of vendors and features offered).

All ACD systems in the accompanying charts offer PBX-type outbound call-handling features

(continued on page 51)

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  Connectivity to the public network is ensured through certifications for a multitude of applications — voice, data, compressed voice, T1, customer controlled reconfiguration and ESF.

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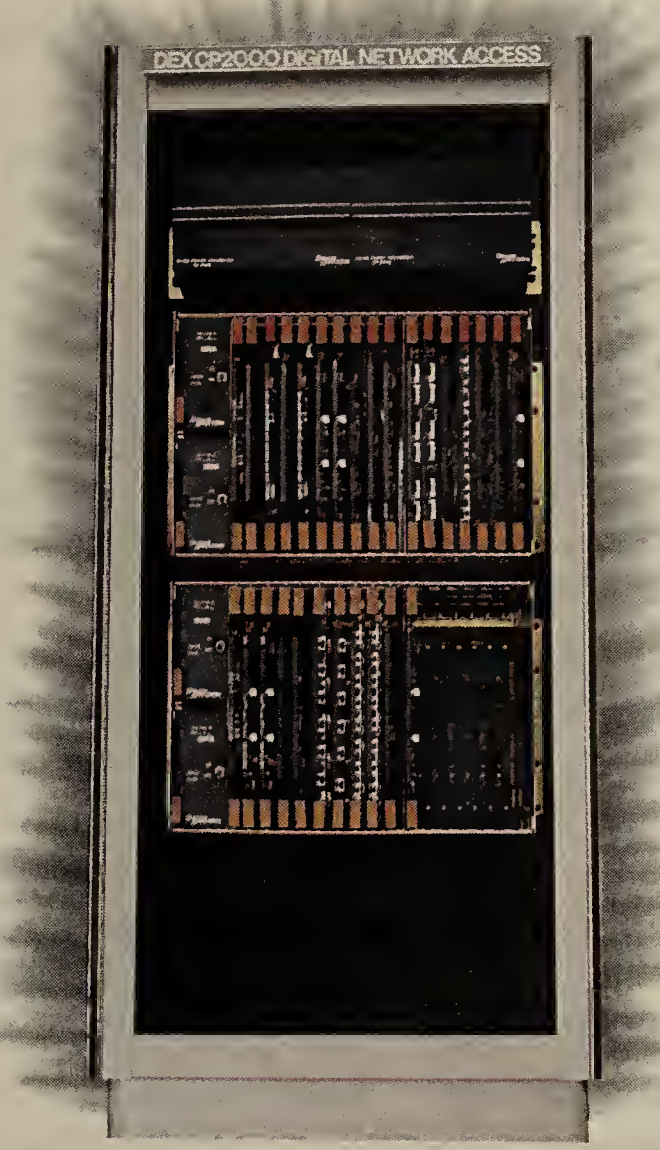

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On the ACD cutting edge

Automatic call distributor (ACD) vendors are preparing to offer features that take advantage of new Integrated Services Digital Network-based services offered by long-distance carriers. However, the only ACD product currently capable of fully supporting ISDN is one from AT&T.

American Express Travel Related Services Co. (TRS) in Phoenix uses AT&T's System 85-integrated ACD with the 3B2/600-based Call Management System (CMS).

TRS is also a pioneering user of AT&T's ISDN Primary Rate Interface service for incoming call management. Through an AT&T 3B processor-based gateway, the ACD interfaces with a host system that has a customer account data base. TRS is experimenting with both automatic number identification (ANI) and call-by-call service selection.

ANI, the first commercially available ISDN service from AT&T, identifies the calling party's telephone number. The primary application for ANI is the automatic matching of the caller's number with the user's data base. This allows the caller's profile to be automatically delivered to an agent's screen, thus saving several seconds on the average call service time.

"ANI works only within areas where equal access technology is in place — that is, the call must originate from an equal-access area for the calling number to be passed through the [Primary Rate Interface] service," explains Barry Wilson, manager of voice systems operation for TRS. "We are pleased with both the number of calls coming through with ANI and the number of matches we are getting with our customer data base. With ANI, we also have the opportunity to update our data base if the calling number does not match."

Another ISDN-based function uses a D-channel message to identify the service type requested when establishing a call on the B channel. The message contains information on the specific type of service the user wants — private-line, public-switched or packet — for setting up the requested connection.

The AT&T service that applies this feature is known as call-by-call service selection. With it, the B channels of an ISDN Primary Rate Interface access line are dynamically reconfigured to access different network services, thus allowing the user's telemarketing call center to achieve significant economies by not dedicating separate trunk groups to inbound services (such as Megacom 800) and outbound services (such as Megacom).

TRS is currently using this service to handle outbound calls that overflow from a primary, outbound calling trunk group. "Through our CMS," Wilson says, "we can watch the traffic peaks in real time and see, for example, that 30% of our ISDN [Primary Rate Interface] access lines are being used for outbound and 70% for inbound traffic. In case a threshold value is exceeded, we can reengineer via the System 85 Automatic Route Selection to, say, 20% outbound and 80% inbound."

— Ranjana Sharma

(continued from page 48)

with least-cost routing. In addition, ACDs, while primarily designed for high-volume incoming call management, also provide support for outbound telemarketing. Outbound telemarketing will almost always require the ACD to interface with an external user-provided data base that maintains a listing of customer telephone numbers and associated information.

ACDs support outbound telemarketing by autodialing from a computerized list of phone numbers. In its simplest form, the agent previews the number and the ACD initiates dialing upon command by the agent. The agent is responsible for monitoring the call progression and disconnecting if a number is busy or there is no answer. The agent enters all call disposition parameters (what the call concerned and how it was handled) manually into the computer data base.

For more advanced applications, more sophisticated ACDs, such as those from Rockwell and Teknekron Info Switch, can support what is known in the industry as predictive dialing. In this, several functions controlled by the agent are transferred to the system. With system-controlled calling, the external telemarketing processor directs the ACD in automatic outdialing. The processor controls the pacing, which is the rate at which calls are placed, and reschedules calls that are not answered. The ACD provides tone/answer detection, and the call is connected with an agent only after a human voice has been detected.

Call centers that handle large volumes of both outbound and inbound calling are making use of AT&T's access arrangement function called Shared Access for Switched Services (SASS). SASS was made available earlier this year as a configuration arrangement from AT&T for direct access line connections (between the customer premises and the AT&T serving office) to Megacom and Megacom 800 services.

With SASS, a user who has both Megacom services can access either over the same access channels. Without SASS, call centers must dedicate separate access channels for outbound and inbound services. AT&T plans to extend SASS to include all switched nodal services, such as Software-Defined Network, Switched 56, Megacom, Megacom 800 and World Connect, by the end of the year.

MIS

The second most distinguishing feature of an ACD is its ability to collect detailed call statistics. ACDs collect real-time call-progress data, unlike the station message detail recording available with PBXs, which provides only post-call data. Manipulation of the call statistics into meaningful reports and displays has spawned a whole industry of third-party ACD/MIS add-on software vendors (see third-party ACD/MIS products chart on page 48).

"ACD manufacturers provide some kind of statistical information only on what is going on inside the apparatus," says Thomas LaBelle, senior associate at LaBelle & LaBelle, a telecommunications and data processing consulting firm in Seattle. "The manufacturers never went far enough in terms of data analysis to generate what the supervisor wanted to see. This has created a great market for software system vendors."

The revenue estimate for this industry varies depending on which market research company provides it. According to The Ergotec Group, a market research firm in Morristown, N.J., the 1987 revenues were $9 million for ACD third-party-supplied add-on MIS software. That figure should double in 1988. Teleos Resources' estimates are substantially higher, with revenue numbers of $27 million for 1987 growing to $83 million by 1992.

According to The Ergotec Group President Daniel Stusser, a complete ACD/MIS system provides real-time reporting, historical reports, and forecasting and scheduling. Some vendors provide complete systems, while others provide only one or two components. With some systems — especially low-end ACDs — there is very little, if any, historical data retention and reporting capability.

The first group of elements of ACD/MIS software are the real-time displays, such as the number of calls in queue, the longest time in queue, the status of agents and the status of trunks. These provide the supervisor with the critical information on which to make current decisions. Based on real-time statistics, the supervisor can take immediate action in response to changing demands, such as adding agents to a group, diverting calls from one agent group to another, changing priorities or taking whatever action is necessary to meet customer service objectives. The screen presentation (color, graphics or text), the information presented and the display refresh rate will vary from product to product.

The second element of ACD/MIS software is the ability to manipulate the data collected by an ACD for historical reporting. The software can create reports to help upper management evaluate system and employee performance, control costs and determine the service levels provided to customers. The reports evaluate and track agent performance, trunk traffic statistics, queue statistics, traffic patterns and several other parameters relevant to business operations.

The ability to gather data into reporting periods (weekly, monthly or quarterly) is important for viewing by different management levels. A shift supervisor may want to view daily reports, but upper management may want to look only at quarterly summaries. Some reporting features available to users are the automatic creation of reports by time of day; on-demand availability of reports for screen display or printing; creation of graphs and charts; and ability to access the data and customize reports.

The third element of ACD/MIS — forecasting and scheduling — predicts future system requirements and prepares an agent schedule to fit the forecast. This software can provide traffic-volume forecasts for periods as small as a quarter of an hour for a day, week or month based on the real history of the call center. The forecast is then used to design optimum work force schedules that will meet traffic demands for prespecified performance objectives.

User applications

Molin/Cutler Telemarketing Services, Inc. of Seattle uses ATM Systems, Inc.'s SR1000 ACD to provide telephone services for clients who need help handling outbound or inbound calls. The system is configured for 150 agents, with three two-way T-1 trunks to access AT&T's 800 services, plus local and Canadian trunks. Molin/Cutler uses AT&T's SASS with its T-1 lines

(continued on page 52)

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(continued from page 51)

to select the calling direction (inbound vs. outbound) according to traffic demands.

"We have a unique setup for inbound call answering," says Tomas Vachuda, director of operations for Molin/Cutler. "We can interface between the ACD and our data bases, which are on two Convergent Technologies [Inc.] minicomputers running software from Source Data Systems, Inc. The interface required some custom development with the help of Solid State Systems, Inc. [an ACD manufacturer], ATM Systems and Source Data.

"We use AT&T's DNIS to set up 60 different 800 numbers," Vachuda says. "The DNIS numbers are assigned to different clients and different advertising mediums. Based on the dialed number, we get exact information on the source and nature of the call. The call comes into the ACD, and the ACD chooses the agent group. When it sends the call to an agent group, it simultaneously sends a packet of information through the interface to our mini.

"The mini, based on the ACD data, sends the agent a screen of information related to the type of call so the agent can answer the call properly," he continues. "The agents have both a terminal connected to the computer and an ACD set. During the call, the agent enters the caller's information and requests into the computer. It was possible to set up this data base interface in part because of the open architecture of the SR1000 ACD. In addition, the ACD also serves as our PBX."

Molin/Cutler is working on utilizing ISDN services such as automatic number identification to match the calling telephone number with either a home or work number in a data base.

Arrowhead Drinking Water, Inc. of Monterey Park, Calif., uses a Northern Telecom SL-1 PBX-based ACD C package along with Monitec Systems, Inc. PC-based MIS software. The ACD serves incoming calls to Arrowhead's customer services facilities with up to 60 agent positions divided into groups of 10 to 14. The incoming calls are mainly from new customers or customers requesting more water. The Monitec System software collects the totals put out through the SL-1's printer port.

"The Northern Telecom SL-1 reports were not adequate for our purposes," says Patrick Tucker, supervisor of night operations. "We needed information on call volumes by agent and agent groups to evaluate productivity and compare performance. We also needed a method to get weekly, monthly and quarterly cumula-

(continued on page 53)

ACD features and functions

Here's a sample of features and functions provided by automatic call distributors (ACD) to manage call center operations. All features may not be available from all vendors. Implementation methods and pricing (standard features or options) also differ among vendors.

■ **Prioritization** allows the ACD to treat an incoming call differently depending on priorities given to the incoming trunk group or a Dialed Number Identification Service number. Agent groups can be assigned priorities to distinguish experienced agents from new agents. Applications of this feature include better service for preferred customers or shorter holding times on more expensive WATS trunks.

■ **Wrap-up** allows agents additional post-call processing time before being considered for a new call. This time can be set automatically at a fixed limit, or it can be set manually by individual agents. In certain applications with only manual wrap-up facilities, users can lose valuable call-related data if the agent forgets to activate it. Forced automatic wrap-up is useful only for applications in which a large percentage of calls have predictable post-call processing times.

■ **Call qualification** (labeled by different vendors as cataloging, enhanced wrap-up or call-account codes) allows agents to qualify a call during wrap-up by entering transaction codes. These codes provide qualitative information regarding the incoming call. The ACD can collect this information for reporting statistics that can be applied for market research or applications such as testing the effectiveness of a special advertising campaign.

■ **Agent identification** provides unique codes for different agents, allowing them to use any phone by logging in their identification code. The ACD system can then track the agents regardless of which set they may be using.

■ **Recorded announcements** are a key function of ACDs, allowing callers on hold to hear messages and announcements. Several vendors are providing digitized, integrated voice announcement capability as a stand-alone function or in conjunction with their automated attendant, voice-messaging features.

■ **Guaranteed message announcement** forces the ACD to reply to all calls with a recorded message before entering the call into a queue. This is useful for special promotional announcements, to inform callers of an upcoming event or to advise callers to call back when service time will be shorter.

■ **Dynamic system administration** allows a supervisor to change system parameters, such as number of calls in queue, length of time in queue and agent/trunk group status, according to real-time conditions. Priorities, routing conditions and announcements can all be changed dynamically to achieve load balance, improve performance and control traffic. ◪

— *Ranjana Sharma*

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tions. The SL-1 gave us only daily summaries, and the others we had to get by manually adding the daily reports. Monitec's software offered a menu-driven, extensive reporting capability with graphs and charts. Instead of just coming out to a printer, information can now be stored on a PC disk."

Advanced Telemarketing Corp. of Dallas handles inbound and outbound calls for businesses. It handles inbound calls for businesses such as catalog houses, hotels and direct marketing response companies. Outbound calls address group sales and prospecting for businesses such as financial service and telecommunications firms.

Advanced Telemarketing has been using the Rockwell Galaxy ACD system since 1985 to serve up to 600 agents. The system supports AT&T Megacom and Megacom 800 service with four two-way T-1 trunks using SASS, US Sprint Communications Co. outbound Ultra WATS service with 16 T-1 trunks and 200 local trunks.

"The Galaxy ACD interfaces to our IBM 4381 and IBM System/38 computers," explains Ronald Nash, senior vice-president. "The ACD identifies an incoming 800 number from DNIS. Through a link to our data base, our agents can get an information screen on how to answer the call. The computer interface also helps us manage the telephone list for outbound calling. The ACD automatically dials the numbers in the list, and the agent monitors the calls. Upon completion of each call, the agent enters information on call disposition into the data base."

Advanced Telemarketing uses the ACD management data to combine the ACD call statistics with data system reports on call disposition and reports from intelligent time clocks, which provide payroll information. "This information is critical for billing calls back to our clients," Nash says.

Paula Young, Inc. is a national mail order company based in South Easton, Mass., near Boston. The company uses an AT&T System 75 PBX with a Uniform Call Distributor, plus Perimeter Technology, Inc.'s RT-10 ACD/MIS package. "We currently get 4,000 to 5,000 calls per week over two separate 800 numbers for incoming telemarketing and customer service," says Kate Lazarovich, telemarketing manager with the company. "Within telemarketing, we will shortly increase to 16 representatives who can take customer orders over the phone. The customer service group currently has 8 agents."

AT&T is offering ACD features with its 5ESS central office product.

▲▲▲

Perimeter's personal computer-based MIS system provides Paula Young with real-time and historical information to help operate its call center. "With line scanners and station scanners, Perimeter provides us with minute-to-minute, real-time information," Lazarovich explains. "I can look at what is happening at this moment: how many calls are waiting, how reps are spending their time and how long each rep has been on a call. A split screen allows us to look at both the customer service and the telemarketing groups at the same time. We can get historical, daily, weekly and monthly reports, which we use for planning, staffing and to see how a rep is progressing."

Future developments

A trend of particular benefit to the small user is the availability of full-featured ACD functions from the local telephone company. Northern Telecom is offering ACD features with its central office DMS-100 switch along with a full-featured personal computer-based customer premises MIS package. AT&T is offering ACD features with its 5ESS central office product in conjunction with Teknekron Info Switch. Central office-based systems will be attractive to Centrex users and users who cannot afford to invest in a stand-alone ACD.

Future ACD products will automate call processing through integrated voice processing and data retrieval via a direct interface to user data bases. Advanced 800 services are also making call center operation easier and more cost-effective. Thanks to these emerging capabilities, ACD products will continue to provide ways of reducing a call center's labor costs. ◘

Letters

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form of opinion columns as well as letters — and always provides a forum for opposing views.

However, we felt compelled to reply to Gottesman's letter, which alleges "factual errors and erroneous conclusions" in our articles on the potential hazards of PVC wiring. We don't agree.

This is an important issue and we welcome continued discussion.

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— Editor

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Sytek pleased by UB move to token-ring

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lect the suppliers and new equipment, it will drop those vendors that do not supply 802.4 MAP products from its list of vendors to be considered.

"I don't think there should be a war [between GM and vendors DEC and Ungermann-Bass]. The customer is king, and we should all be trying to meet the users' demands and not fighting amongst ourselves," Kaminski said.

Sytek, meanwhile, views Ungermann-Bass' action as an opportunity to become one of the premier token-bus MAP network suppliers. Besides Sytek, Concord Communications, Inc. in Marlborough, Mass., Fairchild Data Corp. in Phoenix and Computrol Corp. in Ridgefield, Conn., are prominent suppliers of 802.4 token-bus MAP network products.

"We think there's a great opportunity for broadband in the factory environment," Edholm said. He admitted, however, that there are some obstacles. "If you're a LAN vendor, the inherent problem with marketing token-bus products is that most token-bus products are bundled into the computer and/or automation systems themselves."

Edholm, a former plant engineer at GM with responsibility for computers and networks, said he believes that the user is in the driver's seat when it comes to determining which standard will prevail on the factory floor.

In the mid-1970s, Edholm recalled, all the factories were buying forklifts and every vendor was selling a different type of forklift. "Finally, GM wrote its own spec for a standard forklift," Edholm said, "and within four years, every forklift manufacturer had redesigned its product to comply with the GM specification." ◘

RBHCs can make use of strategic pricing

continued from page 6

By imposing high access fees for private lines, the RBHCs raise the crossover point at which it is economical for a user to migrate from switched services.

In its ruling, the FCC said the RBHCs could set private-line access fees to achieve a certain crossover point without having to meet its new guidelines. In the case of T-1 service, for example, the RBHCs could impose fees that set the crossover point at eight switched circuits.

If the RBHC special access pricing translated into a higher crossover point, the pricing would have to be justified according to the new FCC guidelines. The guidelines require the RBHCs to prove that strategic pricing of private-line access achieves a public policy goal such as preventing bypass. It is not clear what evidence the RBHCs will have to provide to demonstrate that bypass is occurring.

The guidelines also require the RBHCs to set prices that at least roughly reflect the cost of providing service. For example, if high-capacity services cost less to provide than other services, then high-capacity services must be priced lower than the more costly services.

The guidelines also mandate that pricing cannot be so high as to prevent customers from using a service or hinder the introduction of technologies and services.

The RBHCs must show that future tariffs for special access as well as tariffs currently under investigation satisfy the criteria set forth in the guidelines. ◘

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DEC releases voice response unit

continued from page 2

voice for some time, but DECvoice is the first application in which the two are combined and made available to anyone with a telephone.

One possible DECvoice application is for order processing. A customer could use a rotary dial phone to call into a DECvoice system and, using the system's voice recognition feature, request information on a particular product by giving the product number. The voice synthesis feature would read back the information from converted ASCII text files.

The caller could also order a set amount of the product, saying where and when it should be delivered. The message would be digitized and stored. At the end of the transaction, the synthesized voice would read back the order for verification.

David Terrie, president of NewPort Consulting in Scituate, Mass., said the combined technologies of DECvoice give DEC an edge over its competition. "It turns the screw a little bit on IBM and the rest of the competition," Terrie said. "If you have a specific type of application where you'd like to take advantage of voice integration, then DEC is much more likely to be your vendor."

To aid application developers, Cullinet Software, Inc. announced Enterprise:Expert/VMS software (formerly Application Expert) at Info '88 specifically designed for DECvoice.

The development software includes about 90% of the code users would need for a typical application, said Michael Morrison, Cullinet's manager of applied technologies. It also lets users run tests of their applications on their workstations, rather than the cumbersome process of conducting "live" telephone tests.

DEC has an around-the-clock demonstration of DECvoice set up that can be accessed by calling (508) 493-8255. The demonstration includes theoretical applications in health care, distribution, telecommunications and finance.

A base configuration of the packaged DECvoice Response System supports four DECvoice phone lines and costs $54,000. Each DECvoice Q-bus component board costs $4,000. The product is available now.

All-In-1

The Distributed Directory Service enhancements for All-In-1 offer simplified E-mail routing by enabling users to send messages by simply entering the recipient's name. Distributed Directory Service can search geographically dispersed or departmental data bases to find the recipient's network address.

Distributed Directory Service is a component of DEC's Mailbus Network Services that allows All-In-1 users to access X.400 E-mail systems as well as those based on IBM's Professional Office System and Systems Network Architecture Distribution Services.

User profiles contain fields for the user's name (including selections for multiple versions), department, organization, internal location, full X.400 address, job title, postal address, telephone number, addresses for multivendor message delivery, security controls and other information.

The personal portion of the profile is managed by each user, while other elements, such as node name and security information, are maintained by the system manager.

The profile is the source of prompts that users receive to determine the correct message recipient if multiple users have the same name.

Analysts said the Distributed Directory Service upgrade is an important step for DEC, especially considering that its All-In-1 system can access other E-mail nets with a potentially large number of end users.

"This can relieve a tremendous amount of the administrative effort in updating addresses on a large network," Terrie said. "If you have 100 different nodes on a worldwide net and you can make a change without having to update them all individually, you've eased one of the great burdens of running a big mail net."

All-In-1 Version 2.3, which includes Distributed Directory Service and other enhancements, is scheduled for availability in the fourth quarter of this year. Prices range from $7,088 for the MicroVAX 2000 to $112,219 for the VAX 8978.

All-In-1 Starter, a low-end version of All-In-1 that can be upgraded to the full Version 2.3, is scheduled for February release. Its price ranges from $2,480 for the VAXstation II and VAXstation 2000 to $78,570 for the VAX 8978. ◻

Firms invest in nets after crash

continued from page 7

"I think they're being a bit more cautious, and I really don't blame them for not setting up elaborate computer systems," he said.

Jane Laino, president of Corporate Communications Consultants, Inc., a New York-based consulting firm that manages telecommunications networks for Wall Street firms, agreed that securities firms have been conservative this year.

"I can't honestly say I've noticed many firms expanding their networks," Laino said. The exceptions, she said, have been firms that have merged their businesses and consolidated their networks.

DEC signed a $30 million contract this year with Citicorp for a global trading system and a $10 million agreement with Bankers Trust Co. for a trading room system in London, Bracken said. ◻

Calendar

Oct. 26-28, Washington, D.C. — Advanced LANs: Connectivity and Network Management Issues. Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Oct. 27-28, Boston — An Incisive Look at DOD-STD-2167A & 2168. Contact: DOD Software Seminars, c/o David Maibor Associates, P.O. Box 846, Needham Heights, Mass. 02194.

Oct. 30-Nov. 2, Washington, D.C. — From Vision to Payoff: Twentieth Annual Convention & Exhibition. Contact: Information Industry Association, 555 New Jersey Ave., N.W., Washington, D.C. 20001.

Oct. 31-Nov. 1, Washington, D.C. — Systems Integration Conference. Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701.

Oct. 31-Nov. 1, Arlington, Va. — 55 Greatest Cost-Cutting Techniques. Contact: Telephone Angles, 4550 Montgomery Ave., Bethesda, Md. 20814.

Oct. 31-Nov. 3, Chicago — AUTOFACT '88 Conference. Contact: Society of Manufacturing Engineers, 1 SME Drive, Dearborn, Mich. 48121.

Oct. 31-Nov. 4, Chicago — James Martin World Seminar. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Nov. 2-4, Boston — LOCALNET '88. Contact: LOCALNET '88, CMC Registration Department, 200 Connecticut Ave., Norwalk, Conn. 06856.

Nov. 2-4, San Francisco — Telecommunications Management. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

Nov. 3, Chicago — Network Management for the Banking/Financial Industry. Contact: Timeplex, Inc., 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

Nov. 7-9, New York — Voice/Data Integration and ISDN. Contact: Institute for Advanced Technology, 1450 Energy Park Drive, St. Paul, Minn. 55108.

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Empire Net helps N.Y. in cutting costs

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Inc.'s (EMI) existing microwave inter-LATA transmission services.

The network will be funded from the state's existing telecommunications budget and did not require any capital expenditure approval from the state legislature, Heinsohn said. In fact, the network will save so much in transmission costs that it will start reducing the overall budget almost as soon as it is cut over.

In addition to savings promised by Empire Net, the state is saving $4.5 million a year with six AT&T System 85s supporting 32,000 lines that were installed here last year to replace three Centrex systems. The state is also saving $2.5 million to $3 million a year on switched voice services through the use of a private tandem network that consists of four switches linked by microwave facilities.

The state recently installed an AT&T Information Systems Network (ISN) to link state offices in Albany. That network, dubbed Capital Net, consists of 24 ISN nodes supporting 4,000 users. Those nodes provide links to devices in 59 local state office buildings via a fiber-optic system installed in state-owned conduits.

Empire Net will actually be a service provided by a vendor consortium headed up by Syracuse, N.Y.-based EMI. The team also includes IBM and several Nynex Corp. subsidiaries. "We do not own any of the component parts. It's a service we're buying," Heinsohn said.

The Empire Net service was approved by the New York Public Service Commission as a limited service offering, a special tariff providing fixed costs for the length of the five-year contract.

The net was designed by Nynex, New York Telephone and EMI. The state gave contract bidders a list of existing circuits and told them where the circuits originated and terminated. Network Strategies, Inc., a Fairfax, Va.-based consulting firm, helped evaluate the bids.

Other bidders included AT&T, Rochester Telephone and a Racal-Milgo/MCI Communications Corp. team. Each of those vendors submitted higher bids than the EMI group. "The low bid was a design we felt was good," Heinsohn said. "Cost entered the process as a decision maker."

To support Empire Net, New York Telephone will buy more than 100 Network Equipment Technologies, Inc. Integrated Digital Network Exchange (IDNX) T-1 multiplexers from IBM and install them in its central offices. Since Rochester Telephone was a competing bidder, the EMI team is only now planning how to connect with the LATA served by that company.

In the other six LATAs, remote state agencies will be linked to New York Telephone central offices via switched facilities, and Empire Net data traffic will feed into an IDNX T-1 mulitplexer. The T-1 traffic from each LATA will be collected at an EMI point-of-presence, and EMI will transmit the data to the desired destination, where New York Telephone will route individual data channels or T-1 lines to the receiving host.

Although not in the current plans, the IDNX net could be used to feed voice calls to the tandem switch network. The state currently uses Dallas-based Advanced Business Communications tandem switches here and in New York, Syracuse and Buffalo. The tandem switches are directly linked to more than 130 state-owned PBXs in state offices via a mix of facilities.

Currently, callers at sites not directly attached to one of the tandem switches dial an 800 number to access the nearest tandem via the switched net. EMI supports the inter-LATA traffic between the tandems.

New York Telephone will manage and maintain the intra-LATA T-1 networks, while EMI will manage and maintain the inter-LATA microwave network and monitor the intra-LATA T-1 networks.

A console installed in the state's Network Control and Administration Center (NCAC) here will enable the state to configure and monitor remote IDNXs from a central site. The NCAC will also support a help desk and network repair personnel staffed by Nynex technicians.

United Telecom credits US Sprint for increased earnings in 3Q '88

By Bob Brown
Senior Writer

KANSAS CITY, Mo. — United Telecommunications, Inc. said last week its third-quarter earnings more than doubled from the year earlier, due largely to a "dramatic improvement" in the financial performance of US Sprint Communications Co.

In a separate announcement that bodes well for the current quarter, US Sprint said last week that General Electric Co. signed a three-year, multimillion-dollar agreement for a variety of services offered by the long-distance carrier, a joint venture of United Telecom and GTE Corp.

For the third quarter, which ended Sept. 30, United Telecom reported net earnings of $54 million, up from $24.1 million for the corresponding period last year. Revenue for the period jumped to $805.8 million, up more than 7% from $750.6 million reported for the third quarter last year.

One of the key factors in United Telecom's improved performance was a significant reduction in US Sprint's pretax losses — a reduction considerably greater than that predicted by United Telecom in preliminary results for the quarter that were released in September ("US Sprint zeros in on profitability," *NW,* Sept. 19).

US Sprint's pretax loss of $19 million for the quarter was down from a loss of $165 milion in the third quarter of 1987 and a loss of $112 million in the second quarter of 1988. United Telecom last month announced that it expected US Sprint to report pretax losses of no more than $35 million for the third quarter.

After taxes, United Telecom's 50% share of US Sprint's losses was $44,000 in the third quarter, compared to $44.7 million for the comparable period last year.

In July, United Telecom agreed to buy 30.1% of GTE's stake in US Sprint in January, with the option to purchase more of GTE's stake later.

According to William Esrey, president of both United Telecom and US Sprint, signing on large users has been a key to US Sprint's financial improvement this year.

While specific financial terms of the US Sprint agreement with GE were not disclosed, the long-haul carrier said its virtual private network, WATS products, Meeting Channel videoconferencing services, 800 services and Foncard are included in the agreement.

Other reasons for US Sprint's revenue growth include new offerings in the 800, international and operator services markets, Esrey said.

Billing system improvements and the transition of customer traffic to US Sprint's nationwide fiber network from leased AT&T lines during the second quarter have also contributed to the company's recently improved performance, he said.

AT&T to cut switched service rates

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ble by an increase in the monthly subscriber line charge paid by businesses and residents to local telephone companies. The $2.60 charge per access line will be increased to $3.20 on Dec. 1.

As customer charges increase, access line charges for long-haul carriers are reduced. AT&T, for example, will save 60 cents per access line per month and will pass the savings on to users in the form of lower prices for switched services.

Analysts predicted AT&T will file for further price cuts in February. This round of reductions would take effect April 1 — the day that the subscriber line charge is raised to $3.50 a month.

According to the spokesman, AT&T has reduced long-distance prices by more than $8 billion since divestiture. That figure includes reductions in both switched and dedicated services. The company's most recent rate reductions took effect in January and reduced prices by $772 million.

Where AT&T goes, its competitors are sure to follow, said Robert Self, owner of Market Dynamics, Inc., a New York-based communications consulting firm.

When asked about AT&T's price cutting plans, archrivals MCI Communications Corp. and US Sprint Communications Co. said they have not yet decided if they will match AT&T's cuts.

Users will analyze AT&T's cuts as well as reductions offered by competitors before buying additional services or changing carriers, Self predicted.

Edward Ziesche, international telecommunications administrative manager for Cargill, Inc., a Minneapolis-based commodities brokerage firm, said the price cuts are important but stressed that he does not buy on cost alone. "We look at the quality of service," he said.

The price cuts will help AT&T remain competitive with aggressive long-distance service rivals, according to Steve Sazegari, a senior telecommunications analyst with Dataquest, Inc., a San Jose, Calif.-based communications research firm.

"AT&T is under attack on all fronts," Sazegari said, citing the recent merger of Teleconnect Co. and SouthernNet Inc. — regional long-distance service providers — as evidence of increased competition in the voice services market. The newly merged and as yet unnamed firm has already announced its intent to enter the lucrative 800 services market, Sazegari said.

Market Dynamics' Self said AT&T's competitors are "in no tremendous rush to match AT&T's cuts."

MCI, US Sprint and other carriers often wait several months before cutting rates in response to AT&T cuts.

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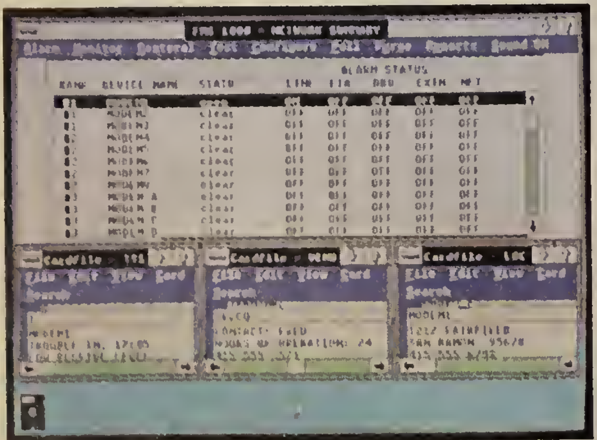

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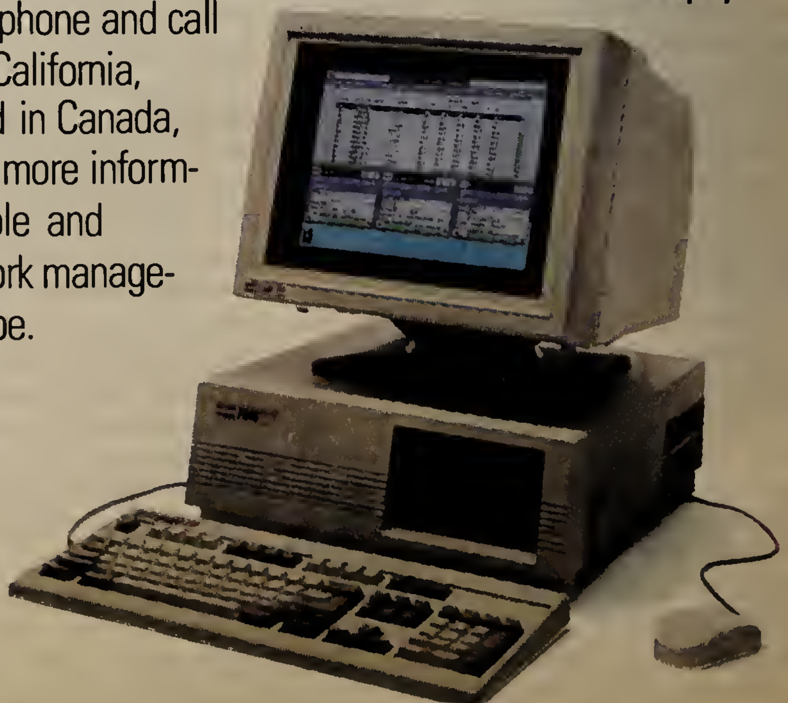

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